

THE UNIVERSITY OF ALBERTA

MEASURING THE ECONOMIC WELL-BEING
OF CANADIAN FARMERS 1949 - 1976

by



Linda Chase

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF SCIENCE

in

AGRICULTURAL ECONOMICS

DEPARTMENT OF RURAL ECONOMY
EDMONTON, ALBERTA

SPRING 1980

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Measuring the Economic Well-Being of Canadian Farmers 1949-1976" submitted by Linda Chase in partial fulfilment of the requirements for the degree of Master of Science.

A. L. Leman
.....

Supervisor

Michelle Veeleman
.....

J. J. Veeman
.....

Date ... *2. November 1979*

DEDICATED TO
THE MEMORY OF R. DARWIN CHASE
AND TO
JEAN CHASE, WHO REMEMBERS



ABSTRACT

Farmers' economic well-being can be measured in terms of income or net worth or some combination of the two. Net farm income has been the most common measure used. Typically, net farm income has been both variable in the short run and low in the long run. Throughout the 1950s and 1960s, relative price changes between the farm and nonfarm sectors, and machinery investment requirements due in large part to rapid technical change in agriculture, contributed to attention being placed on net farm income as an indicator of farmers' economic well-being. More recently, the impact of inflation on capital investment in agriculture, particularly land investment, has made capital gains an important addition to a measure of farmers' economic well-being.

Using a measure which combines income and asset values as components of an economic well-being measure, this study estimates Canadian farmers' economic well-being from 1949 to 1976. Secondary data published by Statistics Canada on farm income and farm asset values form the basis of the estimates. Gross farm asset values are annuitized to reflect a flow of benefits to asset owners over a 30-year period. Three interest rates are used to sensitize the annuity calculation to various conditions in the farm credit market. These annuity values are then added to net farm income to produce a composite measure for economic well-being.

The real economic position of Canadian farmers is found to improve over the period studied. However, all provinces in Canada have not shared equally in this improvement, either on an aggregate or on a 'per farm' basis. Relative to net farm income, farm asset values are an increasingly important component of the economic well-being measure.

The estimates calculated in this study represent a first approximation of measures of farmers' economic well-being which include more than net farm income. More accurate measurement could be achieved with the inclusion of data on off-farm income, quota values and asset liability or net investment in agriculture.

ACKNOWLEDGEMENTS

Several people deserve particular acknowledgement for the realization of this study: my professor and supervisor, M.L. Lerohl, for his inspiration and guidance; my professor and advisor, M.M. Veeman, for her insightful comments and instruction; my sister, K. Merrett, for her encouragement and understanding; my brother-in-law, R.J. Merrett, for his expertise and challenge; and my mother, J. Chase, for her devotion and support. A special thanks also goes to E. Shapka, to C. Shier and to my colleagues in the Department of Rural Economy, who provided a lively atmosphere as well as technical assistance, both invaluable for study.

TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT	v
ACKNOWLEDGEMENTS	vii
LIST OF TABLES	x
LIST OF FIGURES	xi
INTRODUCTION	xii

Chapter

1 THE AGRICULTURAL SECTOR AND ECONOMIC WELL-BEING

Introduction	1
Concerns About Farmers' Economic Position	1
Farmer-Motivated Concerns	2
Government-Motivated Concerns	3
Consumer-Motivated Concerns	5
Definitions	8
Net Worth	8
Economic Position	9
Well-Being	10
The Structure of Canadian Agriculture	11
Technical Relationships of Supply & Demand	12
Macroeconomic Influences	15

2 REVIEW OF LITERATURE

Introduction	23
Farmers' Economic Position Post-1945	24
Farm/Nonfarm Interrelationships	24
Farm Input Requirements	25
The Cost-Price Squeeze	27
Asset Ownership	31
American Studies	31
Canadian Studies	38
An Income-Net Worth Measure	39
The Measure and Suggested Uses	40
Applications of an Income-Asset Measure	41
Off-Farm Income	46
Summary	48

3	AN INCOME-ASSET MEASURE FOR THE ECONOMIC WELL-BEING OF FARMERS	
	Introduction	49
	Specification of the Measure	50
	Interpretation of the Measure to Agriculture	52
	The Farm 'Unit'	52
	The Farm Income Stream	53
	Annuitization of Net Worth	55
	The Canadian Context	56
	Owner versus Renter	56
	Credit Availability	57
	Realization of Gain	59
	Summary	61
4	ESTIMATION OF THE AGGREGATE ECONOMIC POSITION OF CANADIAN FARMERS	
	Introduction	62
	Data Sources and Weaknesses	63
	The Procedure	65
	Net Farm Income	65
	Asset Values of Farmers	67
	Annuitized Asset Values	69
	Current Dollar Estimates for Economic Well-Being	70
	Constant Dollar Estimates for Economic Well-Being	70
	Estimated Economic Position of Canadian Farmers	71
	Aggregate Net Farm Income & Economic Position	71
	Proportion of Net Farm Income to Economic Position	76
	Distribution of Census Farms and Economic Position	89
	Economic Position on a 'Per Farm' Basis	93
	Sectoral Comparison of Economic Position	98
5	SUMMARY AND CONCLUSIONS	101
	* * * *	
	BIBLIOGRAPHY	105
	APPENDIX A	113
	APPENDIX B	123
	APPENDIX C	126
	APPENDIX D	129

LIST OF TABLES

<u>Table</u>	<u>Description</u>	<u>Page</u>
1	Percent Distribution of Census Farm Numbers, Real Net Farm Income and Real Economic Position Across Canada, Selected Years	92
2	Average Real Net Farm Income and Real Economic Position in Canada, Selected Years	94
3	Sectoral Comparison of Average Real Economic Well-Being Measures in Canada, Selected Years	99

LIST OF FIGURES

<u>Figure</u>	<u>Description</u>	<u>Page</u>
1	Proportions of Farm Asset Categories in Canada	68
2	Estimates of Real Net Farm Income and Real Economic Position in Canada, Selected Years	72
3	Geographical Distribution of Real Net Farm Income and Real Economic Position, Selected Years	74
4	Proportion Real Net Farm Income to Real Economic Position - Canada	77
5	Proportion Real Net Farm Income to Real Economic Position - Prince Edward Island	79
6	Proportion Real Net Farm Income to Real Economic Position - Nova Scotia	80
7	Proportion Real Net Farm Income to Real Economic Position - New Brunswick	81
8	Proportion Real Net Farm Income to Real Economic Position - Quebec	82
9	Proportion Real Net Farm Income to Real Economic Position - Ontario	83
10	Proportion Real Net Farm Income to Real Economic Position - Manitoba	84
11	Proportion Real Net Farm Income to Real Economic Position - Saskatchewan	85
12	Proportion Real Net Farm Income to Real Economic Position - Alberta	86
13	Proportion Real Net Farm Income to Real Economic Position - British Columbia	87
14	Number and Proportion of Occupied Farms in Canada, 1951 and 1976	90
15	Average Real Net Farm Income and Real Economic Position in Canada, Selected Years	96

INTRODUCTION

Concern exists in Canada about the economic well-being of farmers. What is more, the impact of inflation has increased uncertainty about real economic positions. An explicit examination of the level of farmers' economic position and its change over time is required before an understanding of the situation can be expected.

Traditionally, income has been the sole measure of farmers' economic well-being. Income continues to be a necessary part of such a measure but no longer is it sufficient. To bring into clearer focus the economic position of Canadian farmers, two steps must be taken. The first is to develop a meaningful measure for examining economic well-being of farmers. The second is to use this measure to determine the level of farmers' economic position and its change over time. This study describes a measure which could be used to examine economic position and, using this measure, empirically estimates the economic position of Canadian farmers over a 28-year period.

Proceeding from the introduction, there are five chapters to the study. Chapter 1 is designed to orient the reader towards the subject of farmers' economic well-being. It discusses several incentives to accurate measurement, defines terms and describes the economic environment surrounding the Canadian farm sector.

Chapter 2 reviews past approaches to measuring farmers' economic position. Previous studies vary in their emphasis on farm income as a measure or on farm assets or on some combination of the two. Off-farm income has received attention more recently as contributing to farmers' economic well-being.

Chapter 3 presents a measure for economic well-being and considers theoretical and practical problems inherent in using an income-asset approach to its measurement. Characteristics of the income stream and asset values specific to the agricultural sector are discussed, along with a few examples of practical problems which may be encountered in measuring farmers' economic position. In this discussion, data requirements are assumed to be ideally realizable.

Chapter 4 provides empirical estimates of the economic position of Canadian farmers on national and provincial aggregate levels from 1949 to 1976. Actual data sources are described along with the method used to calculate the estimates. These estimates are based on data from secondary sources. They are incomplete in the sense that existing data sources are insufficient to provide all estimates ideally required from a theoretical point of view. Only secondary data on income from farm employment,

income in kind and supplementary payments to farmers are included in the Canadian income estimates. Not included are data on off-farm employment nor investment income. Farm asset value estimates used in the study are not net of liability, nor do they include estimates for quota values. Despite their incompleteness, the present estimates are a first approximation at including asset values along with income as an indication of farmers' economic position.

Chapter 5 summarizes the study and draws conclusions from the analysis. It also recommends areas for future research in the measurement of farmers' economic well-being.

CHAPTER 1

THE AGRICULTURAL SECTOR AND ECONOMIC WELL-BEING

INTRODUCTION

The present chapter provides the reader with an orientation towards the study of economic well-being in an agricultural setting. Information is grouped into three sections. Different perceptions about the economic well-being of Canadian farmers are held by major segments of our society. The first section discusses various concerns of farmers themselves, of governments and of consumers. The second section clarifies terms specific to the study. The three concepts defined are: net worth, economic well-being and well-being. Changes in the structure of the agricultural sector and between it and the wider economy which have a bearing on farmers' economic well-being are discussed in the final section.

CONCERNS ABOUT FARMERS' ECONOMIC POSITION

Concern about the economic well-being of farmers comes from three sources: farmers themselves, government and, more recently, consumers. Each group has reasons stemming from self-interest to know the real economic position of farmers. Also out of self-interest, each group is

committed to ensuring the strength of farmers' economic well-being. These concerns are related to economic forces from both inside and outside the agricultural sector which bring about structural change. A subsequent section will discuss economic causes for structural change; the discussion here indicates how each social group is affected by such change.

FARMER-MOTIVATED CONCERNS

Each farmer has a direct concern for his economic position for it is through this that his economic goals must be met. These goals include maintaining family living standards, maintaining the farm business, expanding and/or changing farm operations, and meeting the special needs of the new entrant and those wishing to retire. These goals exist, in total or in part, for any farm operation. Should achievement of any of these goals become more difficult, concern of the farmer intensifies.

Changing relative prices and, more recently, inflation in all prices have affected farmers' economic position. Historically, the share of the agricultural sector in the total economy has declined with national economic development and returns to farm labour have not increased at the same rate as those of the non-farm sector. During the 1950s and 1960s, there was a tendency for farm costs to increase more rapidly than farm prices. Technical change encouraged the use of more capital equipment, often larger in capacity, which brought greater reliance on off-farm inputs. Such changes put stress on the maintenance of family living standards and farm operations from farm income alone.¹

1. Canada Department of Agriculture Task Force, Orientation of Canadian Agriculture, Vol.1 Part A (1977) p.91. See also Federal Task Force on Agriculture, Canadian Agriculture in the 1970s (1969).

In the 1970s, farm land prices have increased significantly, further exacerbating demands for capital. As well as adding rigidity to consumption/investment decisions, thereby affecting lifestyle and farm operation, such capital expenditure requirements made it difficult for the new entrant and hinder expansion or shifts of farm operations from one activity to another.² From the retiree's point of view, the increased value of land has improved his economic position, though these gains may be somewhat lessened if the purchasing power of his fixed income is reduced by inflation.³

GOVERNMENT-MOTIVATED CONCERNS

Governments' concerns stem from two sources: 1) directly from the fulfilment of governments' public responsibilities and 2) indirectly from their role as representing the interests of all groups in the society, including those of farmers and consumers.

(1) There are two basic economic goals that governments at all levels seek to achieve. One is to ensure at least a minimum standard of living for those within the social structure; the other is to ensure economic growth per capita. Other economic goals such as full employment, efficient use of resources, and stable prices and incomes may help to achieve primary goals. Insofar as the economic position of farmers enters into these

2. W.H. Scofield, "Land Prices and Farm Income Relationships", Agricultural Finance Review, Vol.25 (August 1964).
3. H.F. Breimyer, "Heterogeneity in Agriculture: Impediment to Definition of the Farm Problem", JFE Vol.42 #5 (Dec. 1960) pp.1509-1510. See also A.R. Tubbs, Agriculture in the Current Economic Environment, Ag.Ec. paper #7117 (Nov. 1971).

goals, it is of concern to governments. Thus, governments traditionally have been interested in situations of low farm incomes, unstable farm prices and incomes and capital investment in agriculture, though the emphasis has not been equal in all areas at all times and effectiveness of chosen policies has been questioned.⁴

(2) Not all goals of government are consistent with each other. Short term solutions to immediate problems may result in greater problems in the future. Responding to desires of a particular group is likely to entail ignoring the needs of others. Different sectors of society have been perceived to have conflicting economic goals. For example, prices for farm products considered adequate by some producers may be thought inconsistent with consumers' desire for lower food prices. A role of government is to assist a resolution where goals appear to conflict.

Increasing knowledge about actual economic positions and their roots is a step toward resolving economic problems. In particular, information about farmers' real economic position and how it has changed over time will help to clarify perceived problems and set the stage for finding realistic solutions where problems exist.

4. See: W.M. Drummond, W.J. Anderson and T.C. Kerr, A Review of Agricultural Policy in Canada (June 1966); T.W. Schultz, Economic Growth and Agriculture (1968); Federal Task Force on Agriculture, Canadian Agriculture; M.M. Veeman and T.S. Veeman, "The Directions of Canadian Agricultural Policy", CJAE Proc. Issue (1976) pp.78-90; and Canada Department of Agriculture Task Force, Orientation, Vol.2 "Domestic Policies and External Factors which have Influenced the Development of Canadian Agriculture" (1977).

CONSUMER-MOTIVATED CONCERNS

Consumer concerns have added urgency to the task of quantifying the economic position of farmers. Two types of consumer concerns appear most urgent. One relates consumer food prices to farmers' income and wealth position; the other links supply of agricultural products with farmers' economic well-being.

Consumer Food Prices

Price movements in the 1970s have led to significant increases in farm net incomes and farm asset values while, at the same time, the rising price level has cut into the purchasing power of the consumer dollar. The increasing proportion of non-farmers to farmers in the population only adds to the degree of consumer interest. Although sudden changes in farmers' economic position and in consumer purchasing power are in some measure independent events,⁵ together they have drawn consumer attention to farmers' economic position.⁶

Supply of Agricultural Products

A longer run concern is less obvious but could be of greater significance to the consumer. This is the link between capital investment in agriculture and its effect on consumer food costs in the future. An analysis done by the Food Prices Review Board concluded "that to the degree that higher food prices have increased producer incomes, there

5. For example, high prices for exported Canadian agricultural commodities can add to farmers' gross earnings without directly affecting Canadian food costs; high prices for imported food products add to consumer food costs but not to domestic producers' incomes.
6. See: R.M.A. Loyns and A.A. Warrack, "Rising Prices, Shrinking Dollars — Inflation and the Consumer" (1972); M.M. Veeman and T.S. Veeman, "The Directions"; and G.E. Brandow, "The Food Price Problem", AJAE Vol.55 (1973) pp.385-390.

'has been a concomitant increase in farm investment. Such an increased capital investment will have a beneficial impact on Canada's agricultural productive capacity and this, in turn, should have a moderating effect on food prices in future."⁷

Given that productive capacity does increase in response to a food price increase,⁸ the effect on consumer prices in future depends on the degree of competition in the market and the relative elasticities of demand and supply. These relationships vary among commodities and price effects for specific goods can differ between producer and consumer. In extreme cases, a monopolist or monopsonist may not respond to a shift in supply with a change in price.

In competitive markets, a shift outward of supply will lead to changes in producer price, consumer price or profits. Typically for those commodities with inelastic demand relative to supply, a shift outward of supply would induce somewhat larger price declines than for those where demand were more elastic. Where demand at retail is more elastic than farm gate demand (for example due to added marketing services which have more elastic demand) and supply elasticities are similar at both levels, an outward shift of supply normally would reduce prices received by farmers more than it would reduce prices paid by consumers.

7. Food Prices Review Board, Prices, Incomes and Capital Formation in Canadian Agriculture (March 1975) p.v.

8. An increase in productive capacity is more likely to occur when a price increase is perceived by producers to be more than a short term change and where either ability to expand existing production facilities or potential producers who are awaiting a price increase before entering the market exist, or both.

Changes in supply can induce changes in the marketing margin, the effects of which on prices again depend on the degree of competition in the market and on relative demand and supply elasticities. For example, an outward shift in supply may induce economies or diseconomies of size. Where demand is inelastic relative to supply, most of the price effect from the marketing margin change occurs at the consumer level. Where demand is more elastic than supply, the majority of the price effect of a marketing margin change occurs at the producer level.

It is in consumers' self-interest to encourage an economically viable and developing farm sector. Consumer benefits from increased productive capacity are greater for those commodities with a relatively inelastic demand.⁹ For example, where imports are inaccessible or restricted, consumers would benefit from an increase in domestic productive capacity. It is also in consumers' interest to reduce marketing margins, especially for those commodities where demand is inelastic relative to supply.¹⁰

9. Characteristics of a commodity with inelastic demand include: few other uses for it, few substitutes and that it form a small part of the consumer budget. This contrasts with a commodity having a wider variety of uses, close substitutes (including the availability of imports without trade barriers) and forming an important part of the consumer budget. See R.C. Buse and D.W. Bromley, Applied Economics (1975) p.227/8.
10. Supply elasticity increases if firms' marginal costs are small, if many potential producers exist having cost curves only slightly above those of existing firms and if time to adjust supply is lengthened. See Buse and Bromley, p.109/110.

In summary, different concerns arise out of the goals of different economic sectors, which in turn may be considered within various time frames. At one time, income—either its level or its stability—is of prime importance to the farmer when making economic decisions; another time capital requirements and investment take centre stage. The consumer will notice price more at one juncture; adequacy of supply at another. To fully satisfy all groups' information requirements and to allow for dialogue among them in the event of conflicting goals, a single measure of farmers' economic position is needed. Such a measure must recognize changes in all components of economic well-being in order to provide a useful guide to effective economic decision making.

DEFINITIONS

The concept of economic well-being has specific characteristics in the current study. This section will clarify components of economic well-being and distinguish the concept from potentially overlapping areas. Brief definitions of 'net worth', 'economic position' and 'well-being' are provided here, with further clarification given as needed in the text.

NET WORTH

The net worth of a unit is a value measure of its owned assets, net of liabilities. Physical assets in agriculture usually are classified into three groups: farm lands and buildings, farm machinery and equipment, and livestock and poultry. Where it exists, quota can also have its own value apart from the value of the previously-listed assets.

Off-farm assets may form a part of a farmers' portfolio. Ideally, farmers' net worth would be a summation of the market value of all assets, net of liabilities. As it will appear in Chapter 4, the asset component in the present study comprises values for the three categories of farm physical assets without deduction for liability.

The value of assets cannot meaningfully be combined directly with the flow of income. Following a formula to be discussed later, it can be converted "into an income flow by recognizing that it is translatable into an annuity."¹¹ However, the mathematical potential to translate a stock of wealth into a flow of income is associated with two caveats: 1) there may be no personal advantage to annuitize assets and 2) given, the desire, opportunities making annuitization possible may not exist. This latter point will be examined in this study as it relates to the operation of Canadian credit markets.

ECONOMIC POSITION

Accepting the argument that asset values can meaningfully be translated into an annuity, this study defines the concept of economic position or, interchangeably, economic well-being as one which combines income and asset values into one measure. The importance of including income and asset values to form a composite measure is due in part because both can represent a flow of services at the command of an economic unit and also because each contributes in different proportion

11. B.A. Weisbrod and W.L. Hansen, "An Income-Net Worth Approach to Measuring Economic Welfare", AER, Vol.58 (Dec. 1968) p.1316.

to this flow.¹² This concept is developed in this study to measure economic well-being in Canadian agriculture.

Economic position may be expressed in current or constant dollar values. Current dollar values may be used for cross-sectional comparisons of economic position. Constant, or real, value changes reflect real changes in purchasing power of an economic unit over time, allowing for time series comparisons.

WELL-BEING

The concept of well-being should be distinguished from economic well-being. It has been noted that there may be differences between the economic position of a farm business and that of the farm family.¹³ Well-being as defined here will refer to the latter unit, though there are some interconnections between the farm family and the farm business which need exploring.

Economic position forms a part of well-being by providing monetary resources at the command of the farm unit. However, the possibility of 'psychic income' is recognized as part of the concept of well-being. Psychic income "is the amount of money a person imputes to nonmonetary factors such as enjoyable work, security, etc."¹⁴ which may influence the well-being of a farm operator or farm family. Measurement of such

12. H. Lydall and J.B. Lansing, "A Comparison of the Distribution of Personal Income and Wealth in the United States and Great Britain", *AER*, Vol.49 (1959) p.59. See also Weisbrod and Hansen, p.1316.
13. J.W. Mellor, "Toward a Theory of Agricultural Development", *Agricultural Development and Economic Growth*, ed. H.M. Southworth and B.J. Johnston (1967) p.37. This subject is treated in more detail in Chapter 3 of this study.
14. D.W. Moffat, *Economics Dictionary* (1976) p.188.

factors is not attempted here.¹⁵ Personal values will determine whether the net impact of nonmonetary factors makes a positive or negative contribution to personal well-being.

In some cases, the well-being of an individual reflects only the farm firm's economic position. Presumably, investment in human resources will improve not only the farm operator but also his farm operations. Where the personal desire to decrease risk leads to land investment as a hedge against inflation,¹⁶ it also provides the farm firm with a potentially more viable economic base. Such interconnections between the farm family and farm business should be kept in mind in attempts to better approximate criteria for economic decision-making by farmers.

THE STRUCTURE OF CANADIAN AGRICULTURE

The structure of Canadian agriculture is an evolution of three overriding forces. First, structural change arises from the interaction of supply and demand relationships within the agricultural sector. Second, the agricultural sector operates within national and international economies, which has consequences for both income and wealth positions of Canadian farmers. Third, these forces may be influenced by institutional policies and programs. An examination of technical supply and demand relationships and of the operation of the agricultural sector within a broader economic setting will demonstrate what changes in the structure of Canadian agriculture can be anticipated in the absence of government intervention.

15. See: J.P. Madden, "Income, Wealth and Opportunities of the Farm Population", Benefits and Burdens of Rural Development (1970); or G.M. Bean, J.M. Bohlen and R.H. Warland, Rural Value-Orientations and Farm-Policy Positions and Actions (May 1968).
16. J.F. Scott, "Problems, Policies and Data Needs in Canadian Agriculture", CJAE, Vol.19 #3 (Nov. 1971) pp.93-104.

TECHNICAL RELATIONSHIPS OF SUPPLY AND DEMAND IN AGRICULTURE

Technical relationships of agricultural supply and demand condition structural change through their interaction in establishing equilibrium. Characteristic effects of these technical relationships on farmers' economic position can be seen both immediately and over time. Examination of the interactions of supply and demand in the short run gives a picture of the agricultural sector and may indicate cash flow considerations which can influence structural change. Longer term relationships influence income trends in agriculture and lead to some of the interrelationships between the farm and nonfarm sectors mentioned in subsequent sections.

Technical supply and demand relationships have been discussed in detail elsewhere.¹⁷ Here, a description of agricultural supply and demand relationships is provided summarily, noting influences on farmers' economic position. Typically, unstable farm prices and incomes occur in the short run, while relatively low farm incomes and high capital values are experienced over a longer time period.

Short Run Characteristics of Farmers' Economic Position

Instability in farm prices and incomes stems from rapid shifts in either demand for or supply of agricultural products coupled with short run inelasticities of demand and supply curves. Rapid changes in supply due, for example, to vagaries of weather or to the cyclical

17. M.M. Veeman and T.S. Veeman, "The Changing Organization, Structure and Control of Canadian Agriculture", *AJAE*, Vol.60 #5 (Dec. 1978) pp.759-768; W.D. Jones and F.L. Tung, "A Regional Comparison of Structural Change and Resource Use in the Canadian Farm Industry 1961-1971", *CFE*, Vol.12 #5 (Oct. 1977); Canada Dept. of Agriculture, *Orientation*, Vol.1; M. Wilman, "Changes in Farm Size and Numbers in Canada to 1966", *CFE*, Vol.2 #4 (Oct. 1967).

nature of production, are not uncommon in agriculture. When the shift in demand for agricultural products in the short run is relatively small because, for instance, of slow changes in tastes and preferences, these supply fluctuations can cause unstable agricultural prices and incomes. On the other hand, demand, particularly from export markets, can change drastically in a short time. When supply of agricultural output is nearly fixed within a single production period, unstable prices and incomes can result.

Long Run Characteristics of Farmers' Economic Position

Relationships between long run demand and supply have given rise to historically low farm incomes relative to nonfarm incomes. There are two influences from the demand side which contribute to this situation: 1) the empirically determined Engel's Law (which posits that as income increases, the percentage of income spent on food declines) and 2) slow population growth, where income and population size are both important determinants of the demand for food. In a growing economy where average per capita income is rising and population growth is declining or stabilizing at a low rate, these two characteristics imply slow growth in long run demand for agricultural output.

In the longer run, supply of agricultural products is more elastic. Time increases production response to a change in price. The marginal costs of increasing yields or switching enterprises are relatively low

in agriculture. Further, changes in price may influence capital investment in agriculture which would increase productive capacity.¹⁸ Typically, the long run effect has been to shift supply functions to the right.

Over the long run, there has been a tendency for farm incomes not to keep pace with income changes in the rest of the economy and also for farm capital values to increase faster than farm incomes. Such has been the Canadian experience. Analysis of factor shares in agriculture between 1929 and 1965 showed that the share of net farm income decreased in proportion to net national income.¹⁹ The same study estimated that since 1950, the share of net farm income going to labour has declined while the farm asset share (farm real estate, machinery and livestock) has been increasing.²⁰ Calculations using estimates from the present study suggest that between 1949 and 1976, net farm income increased by 40%, operating expenses by 78% and gross farm asset values by 120%.²¹

It has been argued that these and other structural trends of previous decades have been changing in the 1970s.²² This position holds

18. See footnote 8 on page 6 of this study.

19. M.L. Lerohl and G.A. MacEachern, "Factor Shares in Agriculture: The Canada-United States Experience," *CJAE*, Vol.15 #1 (1967) Table 1, p.4.

20. Lerohl and MacEachern, Table 4, pp.8-9.

21. Calculated from three-year averages taken at the beginning and end of the period of constant dollar estimates of net farm income, operating expenses and asset values. Current dollar estimates appearing in Appendix A of this study were deflated using the CPI (1971=100).

22. G.E. Schuh, "The New Macroeconomics of Agriculture," *AJAE*, Vol.58 #5 (Dec. 1976) pp.802-811.

that major shocks in the United States agriculture now originate from outside the national economy. A response to this stance has admitted that new, exogeneous forces exist but questions whether they signal the disappearance of historical trends.²³ In Canada, the economy traditionally has been more open than in the United States; nevertheless, similar structural trends relating to characteristics of agricultural supply and demand have been observed in both countries. This situation would suggest that some of the more transitional forces as well as new, exogenous shocks still have an impact on structural change. This discussion anticipates the next section which deals with macroeconomic influences on agricultural income and wealth positions.

MACROECONOMIC INFLUENCES

It has long been recognized that the agricultural sector is an integral part of the whole economy.²⁴ Over time, agriculture's share of gross domestic product and of the numbers of workers employed has declined. In 1949, the contribution of net farm income to net national income was 9.1%, which ratio had fallen to 3.5% by 1974.²⁵ Agriculture distributed 10.3% of gross domestic product at factor cost in 1949, a figure which had dropped to 4.4% by 1974.²⁶ The percentage of the employed civilian labour force working in agriculture fell from 21.6% of total in 1949 to 5.2% in 1974.²⁷ As the relative importance of

23. L. Quance and G.C. Taylor, "Anticipating the Future", Looking Forward: Research Issues Facing Agriculture and Rural America (Sept. 1977) pp.7-25.

24. T.W. Schultz, Agriculture in an Unstable Economy (1945).

25. Statistics Canada, National Income and Expenditure Accounts, Vol.1 The Annual Estimates 1926-1974 (March 1976) Table 1, pp.104 and 204.

26. Statistics Canada, Accounts, Table III, Section G, pp.198 and 298.

27. Statistics Canada, Accounts, Table B, pp.195 and 295.

agriculture as a separate economic sector declines, the influence of the rest of the economy on agriculture becomes stronger.

The macroeconomy has had a significant impact on inducing structural change in agriculture. Its impact is felt through three economic forces: relative price changes, technical change and inflation. Each is not totally separate from the other. For instance, relative price changes or inflation may influence technical change, or technical change may blunt the impact of rising costs by facilitating substitution of cheaper capital inputs for more expensive labour. Each is discussed separately in order to see its major influences on structural change.

Relative Price Changes

Price changes in the farm input sector need not be matched by price changes of farm output. Typically, prices in the nonfarm sector grow faster than those of farm products while over time, farmers have become more dependent on off-farm inputs. The 'cost-price squeeze' refers to the situation where farm operating costs are rising faster than product prices, creating low returns to variable inputs, particularly labour. It would be reasonable to assume that during such periods, some farmers caught in the squeeze are forced to exit the industry and also that the rate of entry of new farmers is less than the exit rate.²⁸ Such a situation is aggravated by the short run technical relationships between agricultural supply and demand discussed previously which exacerbate price and income changes.

28. W.D. Jones and F.L. Tung, "A Regional Comparison", p.20.

Change in the number of census farms shows evidence of this cost-price interaction. Using a constant 1976 definition of census farm,²⁹ over a 25-year period from 1951 to 1971 the number of census farms declined from 387,072 to 299,868.³⁰ Over these two decades, the use of off-farm inputs increased rapidly,³¹ assisted by technical change. Between 1971 and 1976, a period which saw abnormally high agricultural prices, the number of census farms increased slightly to 300,118. Although this looks like a reverse of the historical trend, it is more likely "a statistical illusion generated by price effects since large increases in prices, especially for grains, have brought more agricultural holdings over the \$1200 level."³²

Changing numbers of census farms may not reflect the full impact of the cost-price squeeze. If farmers desiring to exit cannot do so, low incomes in agriculture will be the result. Limitations may come from the macroeconomy, from high unemployment for example or prohibitively high transfer costs. On the other hand, they may reflect conditions on the farm such as age or training of farm operators. An alternative to low incomes may be to seek off-farm work. However, this will be hampered by the same conditions that make exiting difficult. Off-farm work has been on the increase. Between 1961 and 1971, the average number of days per farm worked off the farm went from 47.2 to

29. The definition of census farm varied in Canada between 1949 and 1976, changing criteria of acreage and/or value of sale of agricultural products. The 1976 definition includes all farms of one or more acres and gross sales of agricultural products in one year valued at \$1200 or more.

30. R. Daviault, *Selected Agricultural Statistics for Canada*, p.6.

31. I.F. Furniss, "Productivity Trends in Canadian Agriculture 1935 to 1964", *CPE*, Vol.1 #1 (April 1966) p.19.

32. Veeman and Veeman, "Changing Organization", p.760.

54.6 days.³³ However, by 1976 this number had tailed off to 50.4 days,³⁴ perhaps due to high unemployment in the rest of the economy and/or higher farm product prices.

Off-farm sources of income are still important to farmers' economic well-being. By the 1970s, off-farm income accounted for more than half of total income from all sources.³⁵ In 1971, a poor crop year, farm income was only 28% of total. This figure had jumped to 44% in 1974, much of which increase was due to high world grain prices.

Relative price changes may occur also among input prices, inducing factor substitution. This has occurred particularly with respect to farm wages.³⁶ When incomes in the non-farm sector increase more rapidly than those on farms, the opportunity cost of labour employed in agriculture increases. Fewer labourers are willing to work for the wage affordable by farmers and, from farmers' point of view, there is a tendency to substitute relatively cheap capital inputs for the more expensive labour. Recently the impact of fuel and fertilizer prices has been cited as a potential cause for reversing the trend towards capital intensification.³⁷ In 1949, the number of paid workers went from 143,000 to less than 100,000 over most of the period 1966-74. In

33. Jones and Tung, p.29.

34. Statistics Canada, Census of Canada, Vols. 11-13 (1976).

35. Canada Department of Agriculture, Orientation, Vol.1, Table 4.22, p.93.

36. The price index for hired farm labour rose more than any other input price index between 1949 and 1977. Based on 1961 prices, the hired farm labour index in 1977 was 378.0, compared with 207.3 for machinery and motor vehicles and 329.1 for lands and farm buildings.

37. Schuh, "New Macroeconomics".

1975, this jumped to 110,000 and was up to the 1949 level in 1976.³⁸ However, total employment in agriculture has declined steadily since 1949, from approximately 1.1 million to 474,000 in 1976,³⁹ reflecting the long run trend of a decreasing proportion of the labour force employed in agriculture.

Technical Change

Technical change has been considered a major contributor to structural change in agriculture.⁴⁰ Technical change here means "a change in the parameters of the production function or a creation of a new production function" which "results in an increase in output per unit of input".⁴¹

In Canada, changes have been more labour-saving than land-saving,⁴² increasing the size of farms and decreasing the number of operators. Average farm size, holding the definition of census farm constant at the 1976 definition, rose from 350 acres in 1951 to 553 acres in 1976; improved acreage rose from 212 acres to 360 acres over the same period.⁴³ The number of farm operators fell from 386,405 to 300,118 between 1951 and 1976.⁴⁴

38. Daviault, p.186.

39. Daviault, p.190.

40. J.A. Butlin, "The Effect of Canadian Business Cycles on the Adoption of Technological Innovations in Canadian Agriculture 1926/67", CJAE Vol.19 #2 (October 1971) pp.61-71.

41. W. Peterson and Y. Hayami, "Technical Change in Agriculture" in L.R. Martin, ed., A Survey of Agricultural Economics Literature, Vol.1, p.498.

42. Veeman and Veeman, "Changing Organization", p.749 or Lerohl and MacEachern, p.16.

43. Daviault, p.28.

44. Daviault, p.31.

Another impact of technical change on Canadian agriculture has been on tenure arrangements. As capital investment requirements increase, the proportion of owner-occupied farms would be expected to decrease. Between 1951 and 1976, owner-occupied farms declined steadily both in real numbers and in proportion of total, while the real numbers and proportion of part owner, part tenant farming increased. These proportions shifted from 71.9% to 63.0% for the former group and from 19.4% to 31.2% for the latter.⁴⁵ Tenant farming followed in the direction of owner-occupied farms between 1951 and 1971 but during the 1970s, the proportion of tenant farming increased from 4.8% to 5.8% of total.

A relationship between technical change and changes in relative prices which may have an impact on structural change can be noted. Technical change in agriculture has encouraged substitution of capital inputs for labour on farms,⁴⁶ implying that off-farm investment in agriculture has increased. If income sources, either farm or off-farm, are not sufficient to meet investment requirements, farmers' living standards and/or farm operation may suffer.

Inflation

A major impact of inflation on structural change in Canadian agriculture is through capital values, particularly land values.⁴⁷ Real

45. All figures are found in Daviault, p.41.

46. Veeman and Veeman, "Changing Organization," p.759; or Lerohl and MacEachern, p.16.

47. Land and building values make up the largest share of total farm asset values. In 1951, this proportion was 58.4% of total farm asset values; by 1976, the proportion had risen to 76.2% (see Figure 1, p.68 of this study).

gross farm asset values⁴⁸ doubled in the 24 years between 1949 and 1972, from \$8 billion to \$16.5 billion. After four years, gross farm assets in 1976 valued \$27.9 billion, a real increase of slightly more than that of the previous 24-year period.

Such a dramatic change in capital values may affect the structure of Canadian agriculture. Family farms are the predominant organizational unit in Canada. In 1976, 91.5% of farms in Canada were single, private proprietorships;⁴⁹ 3.8% were partnerships and 4.4% corporations (of which 85.9% were family controlled). Individual family farms controlled 81% of farm land, 85% of improved acreage; which when family corporate farms are included amounted to 89% and 92% respectively. However, family farms own a smaller percentage of total capital assets. In 1971, this proportion was 84.3%, falling to 82.4% by 1976. Corresponding figures for corporate farms show an increased ownership of farm capital assets from 4.75% to 9.9% in the same five years. Heavy capital requirements may prove difficult for some family operations to maintain or to secure entry into the industry.

Credit is likely to become more important in the agricultural sector with farmers' share of equity falling over time. From 1961 to 1975, farm credit extended in any one year as a percentage of farm assets rose continuously from 8.7% to 12.7%.⁵⁰ In 1969, it was reported that between 1960 and 1967, total debt outstanding as a percentage of

48. The following figures are based on national aggregate estimates found in Appendix A of this study, deflated using the CPI (1971=100).

49. Veeman and Veeman, "Changing Organization," p.761.

50. Canada Department of Agriculture, Orientation, p.159.

investment in Canadian agriculture increased from 12.5% to 18.2%.⁵¹ This trend has continued over the years so that by 1975, farm debt as a proportion of assets were 19.1%.⁵² This figure is down slightly from 1971, perhaps reflecting more debt cancelled due to higher than normal farm cash receipts in the years just preceeding 1976. Other reasons which could account for the drop are that debts are being used to purchase more than their value in assets or that asset values are increasing faster than debts.⁵³ In any case, there was a perceived problem that "rapidly escalating farm land values, aggravated by competing uses for land, together with the commercialization of farming, have greatly increased requirements for long-term credit."⁵⁴

51. Federal Task Force on Agriculture, Canadian Agriculture, p.338.

52. Canada Department of Agriculture, Orientation, p.158.

53. B.D. Gardner and R.D. Pope, "How is Scale and Structure Determined in Agriculture?" AJAE, Vol.60 #2 (May 1978) p.302.

54. Canada Department of Agriculture, Orientation, p.157.

CHAPTER 2

REVIEW OF LITERATURE

INTRODUCTION

The review of literature summarizes the progression of research towards an income-net worth measure for economic well-being and covers applications of this research. It begins with two books published near the end of World War II. These introduce concepts seminal to the examination of the economic position of farmers. Two distinct spheres of research resulted: one analyzed low returns due to changes in farm prices and costs; the other explored the impact of capital gains on farmer economic well-being. The combination of these aspects of economic well-being into one measure is described and applications of it to analyzing farmers' economic position are outlined.

There has been a predominance of American literature in the area under study. An attempt has been made here to include Canadian writings in the field of farmers' economic position, most of which have been of relatively recent origin.

FARMERS' ECONOMIC POSITION POST-1945

The economic climate of the late 1940s was examined to explain past trends in agriculture and point to what changes could be expected at the end of World War II. Farm/nonfarm economic interrelationships were the initial target.¹ Farmer well-being was linked to the business cycle and to long run economic development trends through changing prices and quantities of agricultural and nonagricultural goods. How relative price changes between farm input categories affect the economic well-being of farmers was a second topic of interest.² Throughout, however, Schultz was aware of the potential of assets to bring windfall gains and losses to farmers and to change income distribution. Also discussed was the function of credit facilities in either limiting or extending economic position. Schultz recognized that both money income and net worth contribute to the economic well-being of farmers, though emphasis was given to the former component.

FARM/NONFARM INTERRELATIONSHIPS

In anticipation of post-War international supply increases, Schultz expected "chronic disequilibrium adverse to agriculture" would occur.³ He explained this condition by different relative price movements between the 'urban industrial community' and the farm gate. Prices farmers receive were sensitive to changes in economic expectations of the urban group while prices farmers pay for off-farm inputs were comparatively

1. T.W. Schultz, Agriculture in an Unstable Economy (1945).
2. T.W. Schultz, Production and Welfare of Agriculture (1949).
3. Schultz, Unstable Economy, p.82.

insensitive. Further, agricultural output responded only slowly to economic expansion associated with business fluctuations compared with industry and thus received a smaller proportion of economic benefits from an economic upturn.

Schultz recognized a potential gain to farmers through changing asset values, though he felt the real gain would come through investment in productive assets other than land. He saw that "when the level of prices rises, farmers are the recipient of unusually large windfalls"⁴ but since he anticipated post-War price declines, he urged that price stability was in the best interests of farmers.

FARM INPUT REQUIREMENTS

How changing input requirements affected farmers' economic position was examined in Production and Welfare in Agriculture. As an important preliminary step, Schultz delineated two ways of viewing the economic well-being of farmers:⁵ 1) as a product of the degree of efficiency in resource use and 2) as a product of the quantity of resources available as well as their efficient utilization. The former is a resource allocation question; the latter is a matter of the degree of equality of income distribution. Hereby Schultz introduced two types of income measurement: one related to production and the other to welfare.⁶ His analysis concentrated on the former, although he made explicit that "if a more rational approach is to be made in dealing with the affairs of

4. Schultz, Unstable Economy, p.260/261.

5. Schultz, Production and Welfare, p.v/vi.

6. Schultz, Production and Welfare, p.29.

agriculture it does become necessary to find ways and means of designing one set of programs which are directed to the problems of production, marketing and credit, and another set of programs which aim at supplementing the income of farm families deemed to be too low."⁷ Despite this warning, many later evaluations of the economic position of farmers have emphasized the role of efficient resource use to the exclusion of the distributional element.

Changes were taking place within the agricultural sector as described by Schultz which affected optimal resource allocation. The effects of rapid technical change in agriculture and of higher costs of farm labour relative both to nonfarm labour and to costs of other farm inputs (capital and land) were becoming evident. Essentially, these contributed to an excess supply of labour in agriculture. "Low farm prices are a result, so are the unfavourable terms of exchange to agriculture, and so is the decline in the rewards to factors employed in farming. ...The key to the problem at hand is the maldistribution of the labour force which has been persistently adverse to workers in agriculture."⁸ The crucial effect for Schultz was the low income per person (both hired and self-employed) which resulted from economic development.⁹

Schultz probed the variable of asset ownership as a potential determinant of economic well-being. Asset ownership, particularly land ownership, provided two things unavailable to the renter: "1) the

7. Schultz, Production and Welfare, p.19.

8. Schultz, Production and Welfare, p.87.

9. Schultz, Production and Welfare, p.107.

"'privilege' of large prospective windfalls and losses and 2) probably more important, that of higher social status in the community."¹⁰ Presumably, as evidenced by the importance given to the second statement, the prospect of inflation or deflation in land prices appeared minimal in 1949. Schultz further argued that the practice of credit rationing "substantially modifies what happens within the firm. ...Faced with the necessity of supplementing his own limited assets with outside capital, a farmer has two alternatives—he may rent or he may borrow. ...The smaller the total assets the farmer owns, the greater the relative difference between the amount of capital that is rentable and the amount that is borrowable."¹¹ Not only capital gain but the size of asset holdings itself made a difference to economic well-being by providing the farmer with access to credit.

THE COST-PRICE SQUEEZE

D.E. Hathaway, writing some ten years later,¹² returned to the business cycle impacts on resource allocation in agriculture which had been discussed by Schultz. Taking the resource allocation problem in a farm/nonfarm comparison, he corroborated Schultz's findings. Economic expansion in the nonfarm sector increased farm output and increased prices paid for nonfarm items more than prices received by farmers. Pointing out that these trends are characteristic of farm income, Hathaway concluded that the problem of unsatisfactory returns to factors of production in commercial agriculture would not be solved completely by maintenance of

10. Schultz, Production and Welfare, p.131.

11. Schultz, Production and Welfare, p.129/130.

12. D.E. Hathaway, "Agriculture in an Unstable Economy Revisited", JFE, Vol.41 #3 (August 1959) pp.487-499.

full employment and economic stability. From an income-only standpoint, he expected that returns to the agricultural sector would decline relatively over time.

In a similar vein, various studies were carried out on the cost-price squeeze throughout the 1960s and into the early 1970s. For example, K.W. Bryant examined not only the changing price of off-farm inputs but also the increasing quantities of nonfarm and mixed inputs being used.¹³ He found that the price effects of nonfarm inputs and the quantity effects of mixed inputs had significant impacts on farm income.

D.H. Boyne¹⁴ separated farm income earners into three categories: farmer and farm-manager families, farm labourer and foreman families, and rural farm families. The income concept used was the sum of wages and salaries, net self-employed income, income from rent, interest and supplementary benefits such as social security. He found that income of farmer and farm-manager families declined as a ratio to nonfarm families (though their absolute income increased). A similar but smaller effect was found for the third category and no distinct pattern showed for the second.

Studies by L. Tweeten and L. Quance continued examination of farm income trends. According to Tweeten,¹⁵ resource adjustment necessitated by technical change, economic growth and 'inflation'¹⁶ continually

13. W.K. Bryant, "The Changing Effects of Nonfarm Business Expansions on Farm Costs", *JFE*, Vol.44 Part 1 (1962) pp.1077-1084.

14. D.H. Boyne, "Changes in the Income Distribution in Agriculture", *JFE*, Vol.47 Part 2 (1965) pp.1213-1224.

15. L.G. Tweeten, "Theories Explaining the Persistence of Low Resource Returns in a Growing Farm Economy", *AJAE*, Vol.51 (1969) pp.798-817.

16. Tweeten likely infers by this term both relative price changes and changes in asset values. See: Tweeten and Quance, "The Impact of

generated disequilibrium through the cost-price squeeze.¹⁷ Although land price increases were noticeable, they were not taken as indicative of a change in well-being. Rather, a change in income was used to explain the change in land prices. Changing land prices were the result of farmers who compete in the land market to take advantage of increasing returns to farm size.¹⁸ Tweeten and Quance¹⁹ predicted that the impact on farm income of the cost-price squeeze would be the major influence on farmers' economic position up to the 1980s. "Past studies have consistently shown a close direct relationship between earnings or returns to durable assets and their value or price. Hence, earnings as measured by net income may provide a more fundamental measure than asset values of the impact of input price inflation on the farm economy."²⁰

Taking a new look at Tweeten's low resource returns arguments, B.B. Perkins²¹ discussed a different interpretation of the income problem which would be more consistent with the observed continuance of low farm income. His return to Schultz's distinction between low resource returns and low returns to few resources again evinced the need to separate these two problems when evaluating farmers' economic well-being. Perkins examined the effects of other sources of economic well-being as well, such as off-farm work and equity which will be discussed further in this chapter.

Input Price Inflation on the U.S. Farming Industry", CJAE, Vol.19 #3 (Nov. 1971) pp.35-49 for reference to the former and Tweeten and Nelson, Sources and Repercussions of Changing U.S. Farm Real Estate Values (1966) for the latter reference.

17. Tweeten, "Resource Returns," p.800.
18. Tweeten, "Resource Returns," p.809.
19. Tweeten and Quance, "Input Price Inflation".
20. Tweeten and Quance, "Input Price Inflation" p.51.
21. B.B. Perkins, "Farm Income and Labour Mobility", AJAE, Vol.55 #5 (Dec. 1973) pp.913-920.

Perkins represents the conventional arguments surrounding farmers' economic position as Tweeten described them.²² Three sources of disequilibrium were named: technical change, economic growth and increasing costs. Perkins suggested two distinctions must be made when looking at factor returns. One was that Tweeten's argument "does not distinguish between the problem of low resource returns in agriculture and the problem of low incomes due to the resource distribution, included under that rubric the quality of the human agent."²³ The second distinction carried the argument a step further by separating conclusions based on ex ante analysis from those based on an ex post viewpoint, where actual benefits and costs do not coincide with those expected. The argument suggested by Perkins states that income returns to farmers with low actual opportunity costs may not be considered low in the sense of disequilibrium.

Taking the agricultural sector in aggregate, Perkins felt that unwarranted expectations could explain the persistence of low farm income. He suggested that more low-income farmers were in agriculture than would be the case if changes in the farm/nonfarm economies had been anticipated fully. For instance, increasing income and fringe benefits in off-farm work were underestimated, as were the managerial skills necessary to effectively run a farm business. Changing social preferences towards consumption and leisure more apparent in urban centres were also a source of farmer dissatisfaction. A final consideration was that a barrier to exit grew with time spent as a farm operator as switching to a full-time off-farm occupation becomes more difficult.

22. Tweeten, "Resource Returns".

23. Perkins, p.915.

ASSET OWNERSHIP

Throughout the 1960s, attempts were made to measure the importance of capital gains in relation to income on farmers' economic well-being. These emphasized a facet of economic well-being which was different from cost-price analyses. Rising values of assets and greater requirements for capital investment in agriculture intensified interest in the role of capital in economic well-being.

AMERICAN STUDIES

In 1960, E.W. Grove addressed the question "Farm Capital Gains—A Supplement to Farm Income?"²⁴ Asset categories examined were: farm land, buildings, machinery, and crop and livestock inventories. Changes in current dollar values of real assets for the average of United States census farms were reported from 1940 to 1959 as a percentage of current income. An average gain was estimated, though because the distribution of assets varied widely over farms, the actual number of farms represented by this average was unknown.

The importance of the distribution of assets was emphasized by Breimyer.²⁵ The difficulty in analyzing the farm problem because of heterogeneity within the agricultural sector was specifically pointed out. It was posited that not only structural differences exist (such as farm size or capital value) which influence benefits from capital gains per farm, but also various goals which alter perceptions of the degree of

24. E.W. Grove, "Farm Capital Gains—A Supplement to Farm Income?", *Agricultural Economics Research*, Vol.12 #2 (Apr. 1960) pp.37-42.

25. H.F. Breimyer, "Heterogeneity in Agriculture: Impediment to Definition of the Farm Problem", *JFE*, Vol.42 #5 (Dec. 1960) pp.1509-1510.

benefit are held by farmers at different stages of life. For example, capital gains due to appreciation of farm land values are perceived as a benefit to the veteran farmer approaching retirement but appear as a burden to the new entrant.

After estimating an average gain over the two decades under review, Grove considered some practical and theoretical problems when combining capital value changes with income. Practically, "the average capital gain or loss...represents a mixture of realized and unrealized (gain or loss), chiefly the latter."²⁶ Furthermore, "net income is for farm operators exclusively, whereas capital gains and losses, whether realized or unrealized, accrue to the owner of the assets."²⁷ When evaluating net gains or losses in the agricultural sector, it must be considered that welfare changes exist only to the extent farmers own the assets they use. An underlying assumption with regard to the inclusion of unrealized benefits or losses not stated by Grove is that the potential for this realization exists in credit institutions. An unrealized gain which cannot be used to mobilize capital as needed would be of less importance to farmers' economic well-being than gains which are used to increase farmers' level of living and/or farm operation.

From a theoretical viewpoint, Grove noted the distributional effect of counting capital gains/losses. On the sectoral level, what is gain to one owner is loss to another; but "for an individual in an

26. Grove, p.38.

27. Grove, p.38.

exchange economy, a realized capital gain is a clear addition to his purchasing power, and a realized capital loss is an obvious reduction in purchasing power."²⁸ With this conclusion, Grove assumed that the full change in capital value in current dollars is realizable in real terms—that inflation or deflation does not change the purchasing power of a gain or loss, a point made by D.M. Hoover, discussed below. In any case, the relative economic position of asset owners resulting from capital gains or losses will change in the directions indicated by Grove insofar as inflation or deflation occurs in the economy as a whole and there is no effect on the purchasing power of any one group.

In 1962, D.M. Hoover estimated real capital gains (in contrast to Grove's current dollar estimates) on physical and financial assets over the period 1940 to 1959.²⁹ These were presented as a ratio to farmer income from all sources.³⁰ His data on physical assets came from a United States Department of Agriculture measure of capital stock. Financial asset data included cash balances, bonds, the value of life insurance and debt.

For the years 1940 to 1959, four results were obtained from Hoover's analysis:³¹ 1) that nominal gains as estimated by Grove overstated real changes by more than four times; 2) that value changes on financial assets were small compared with those on physical assets;

28. Grove, p.39.

29. D.M. Hoover, "The Measurement and Importance of Real Capital Gains in U.S. Agriculture, 1940 through 1959", *JFE*, Vol.44 #4 (1962) pp.929-940.

30. Included were lands, buildings, implements and machinery, livestock and crop inventories, household furnishings and equipment.

31. Hoover, p.933.

3) that, although capital gains reached as high as 40% of net farm income from all sources (in 1958), gains averaged 18% of income over the two decades; and 4) that computed real gains were sensitive to whatever price index was used to deflate current values.

Hoover encountered several problems when treating benefits or losses from capital gains as indicators of economic well-being. First, "capital gains are only potential until the assets involved are sold and the goods making up the standard of value purchased."³² This adds a second step to Grove's interpretation of a realized capital gain. Also Hoover noted that year to year fluctuations in real capital gains may be exaggerated due to the measure's sensitivity to price index changes. Third, the problem of how to combine real capital gains with income was noted. Capital gains were realized over some period of time. Hoover suggested as a solution the selection of a time frame for analysis long enough to allow for the probable completion of the cycle from acquisition of capital asset to realization of gain. Following Breimyer, the limited interpretation of gains to individual farm enterprises from aggregate data was noted as well.

Consideration was given to the possibility of overstating gains and losses. For instance, choosing to calculate changes in capital stock at the beginning of each time period will tend to overstate results. Further, Hoover felt that if expectations of gains from an income-earning asset were realized ex post, there would be an addition to income in

32. Hoover, p.933/935 (*italics in the original*).

following time periods. Therefore, inclusion of both capital gain and increased income over an extended period may lead to double counting in the measure of economic well-being.

Writing two years after Hoover, though without reference made to the former work, D.H. Boyne estimated changes in the real wealth position of farm operators for the period 1940 to 1960.³³ His purpose was to broaden conventional definitions of income by including components derived from monetary and physical asset value changes. Such an extended concept of income could then be used "to evaluate correctly overall income and welfare positions, ...to calculate the real rate of return on investment, thirdly, non-conventional income streams may help to explain farm operators' production and consumption decisions."³⁴

When considering monetary asset value changes, Boyne used the same data sources as Hoover: deposits and currency, U.S. savings bonds and life insurance, net of liabilities. The Farm Family Living Price Index used was also the same, although the base year may have differed.³⁵ Boyne found a net real wealth gain to farm operators of 7.5% of net income over the 20-year period³⁶ compared with Hoover's estimate of 18%. Farm real estate was the largest contributor, some 87% of total net gain. Dividing the two decades into four-year blocks demonstrated the wide variability in gain or loss years, ranging from a net average real wealth loss of 7% of farmers' net income between 1945-49 to a net average gain of 27.3% between 1955-59.

33. D.H. Boyne, Changes in the Real Wealth Position of Farm Operators, 1940-1960 (1964).

34. Boyne, p.5.

35. Boyne used 1910-14=100; Hoover does not state what base year was used.

36. Boyne, p.63.

Boyne tackled problems which were also encountered by Hoover when combining changing asset values with income as a component of economic well-being. Of particular interest is their various treatments of unrealized capital gain. Boyne felt that even if gains were not realized in the sense of being sold, they still may add to current income by, for example, providing a source of savings and thus allowing for reduced conventional savings.³⁷ This argument implies that the gains are incorporated into savings/consumption decisions via expectations, the occurrence of which Hoover felt would lead to double counting if both gains and income were put into one measure and realization took place. Further, Boyne approached the question of expectations differently by analyzing the effect of no expectation of gain (Hoover had analyzed the realization of an expected gain). Boyne stated unequivocally that even in the case where the asset owner is only interested in the stream of income from an asset and where this stream of income remains constant while the asset's value has increased, the owner will still be better off "unless he is truly indifferent between a \$1 perpetual income stream whose value is \$20 and a \$1 perpetual income stream whose value is \$25. ...Such indifference seems highly unlikely."³⁸ In this case, the problem of double counting would not occur as long as the gain goes unrealized.

Additional documentation and implications of changing asset values in the United States in the form of changing real estate values were provided by L.G. Tweeten and T.R. Nelson.³⁹ They argued that "changing

37. Boyne, p.30.

38. Boyne, p.29.

39. Tweeten and Nelson, Sources and Repercussions (1966).

"land prices ... have had an important impact on real income and resource returns in agriculture:⁴⁰ over the period 1910 to 1963. Both the change in net worth position of farmers and the redistribution of income which may accompany a change in land prices are noted. The authors also made the distinction between realized and unrealized gain, the latter being particularly sensitive to liquidity problems caused by inflated land prices (as an example, high taxes reducing net income).

Annual capital gains from United States farm land and buildings from 1910 to 1963 were estimated in real terms.⁴¹ On an aggregate level, gains and losses appeared in three groups: two were periods of gain—the decade 1910-20 and thirty years from 1933 to 1963 (excluding four odd years); losses were experienced from 1921 to 1932.

Distributional effects of these capital value changes were noted by Tweeten and Nelson. In one sense, gains are not added to income but rather are considered as a cost to the farmer who must purchase land at a higher price than some time in the past. Echoing Breimyer, they felt gains to some farmers may be considered as a barrier to entry by another. However, they recognized that "capital gain could provide cash or loan equity to purchase land, machinery, fertilizer, household items or a retirement,"⁴² implying that the asset owner benefits from capital gains.

40. Tweeten and Nelson, p.5.

41. Holding the purchasing power of the gain in constant dollar values where 1958-9=100.

42. Tweeten and Nelson, p.11.

CANADIAN STUDIES

Documentation and analysis of Canadian farm asset values were undertaken by M.L. Lerohl in 1967.⁴³ He provided Canadian national and provincial data on the value of assets, liabilities and net worth for the period 1935 to 1964, as well as indices of such values showing the magnitude of real change. Three asset groups were examined: the major farm assets (land and buildings, livestock and poultry, and machinery and equipment), other assets (such as farm inventories of feed and seed), and equity in marketing and purchasing cooperatives. Net worth was calculated as total asset values net of liabilities.

Several conclusions have relevance to farmers' economic position. Four trends were indicated: that capital values increased sharply; that debt increased relative to all assets towards the end of the period studied; that land rentals did not change significantly; and that equities increased, although the proportion of equity to total assets declined over the last 15 years under observation. It would appear that capital ownership, particularly land, was forming an increasingly larger component of farmers' economic position. Further, access to credit was becoming more important, both to finance the high capital investment requirements and to supplement requirements for increased capital needs beyond any possible reinvestment ceiling imposed by farm cash income.

M.L. Lerohl and G.A. MacEachern estimated trends in factor shares in both American and Canadian agriculture over approximately 40 years to

43. M.L. Lerohl, Assets, Liabilities and Net Worth of Canadian Farm Operators, 1935-1960 (March 1967).

1965.⁴⁴ They computed factor shares of farm real estate, machinery and livestock, and labour. The share of gross income to labour in both countries, calculated either on a labour-wage basis or on a residual basis, declined. The decline was relatively consistent when calculated on a residual basis whereas a falling labour share took place mainly after 1945 when calculated on a labour-wage basis. Meanwhile, the land share in both Canada and the U.S. was rising, with market values rising faster than farm values for the last 15 years studied.

Huff and Cusack explored capital gains in Canadian agriculture for the period 1946-1966.⁴⁵ They estimated annual real capital gains to Canadian agriculture from the main farm physical asset categories: farm real estate, machinery and equipment, and livestock and crop inventories, reporting these as a percentage of total net farm income. They also did a provincial comparison of the distribution of capital gains within Canada. Results were similar to previous trends. Farm real estate continued to account for the majority of capital gains and there were wide fluctuations from year-to-year and period-to-period in net gains and losses. The average gain for the 20 years was 13.4% of net farm income.

AN INCOME-NET WORTH MEASURE

Studies pointing to the importance of assets to economic well-being encouraged effort to include asset values along with farm income as part

44. M.L. Lerohl and G.A. MacEachern, "Factor Shares in Agriculture: The Canada-United States Experience," *CJAE*, Vol.15 #1 (1967) pp.1-20.
45. H.B. Huff and T.J. Cusack, Capital Gains in Canadian Agriculture 1946-1966 (1972).

of an economic position measure.⁴⁶ However, the measures used did not combine asset values with income streams in a consistent manner. In 1968, two economists published "an approach for measuring current economic welfare which is operationally feasible and broader in scope than the traditional money-income measure."⁴⁷ A formula was described and various applications for its use were suggested.

THE MEASURE AND SUGGESTED USES

The measure developed by Weisbrod and Hansen was for assessing the 'economic position' of a consumer unit. This was to be "a function of the flow of services over which it has command",⁴⁸ comprising current income and also services received from assets net of liabilities. The authors felt that the difference between asset distribution and income distribution makes integration of the two components important to understanding economic position.

The method of combining income and assets was to annuitize the asset component into a flow variable, making its addition to income possible. Various time periods could be chosen for the annuity. Weisbrod and Hansen suggested it be a function of the rate of interest and the life expectancy of the consumer unit but the period chosen depends upon the rate of time preference of the unit.

46. Non-Canadian studies relating to this topic include: R.A. Kessel, "Inflation-Caused Wealth Redistribution: A Test of a Hypothesis", *AER*, Vol.46 (1956) pp.128-141; H. Lydall and J.B. Lansing, "A Comparison of the Distribution of Personal Income and Wealth in the United States and Great Britain", *AER*, Vol.49 (1959) pp.43-67; D. Gale Johnson, "Government and Agriculture: Is Agriculture a Special Case?" in H.C. Harlan, ed., *Readings in Economics and Politics* (1961) pp.28-46; W.E. Chryst, "Land Values and Agricultural Income: A Paradox?" *JFE*, Vol.47 Part 2 (1965) pp.1265-1272; and J.W. Mellor, "Toward a Theory" (1967).

47. Weisbrod and Hansen, "Income-Net Worth Approach" (1968).

48. Weisbrod and Hansen, p.1315.

Certain assumptions of the measure were made explicit. The method ignored the question of whether the unit does, in fact, annuitize any assets, or even that it can do so. It merely stated the theoretical possibility of annuitization but to be practical the authors realized there may be interaction with financial institutions which may inhibit its fulfilment. It was also pointed out that to annuitize assets over a lifetime does not leave room for bequest, though this could be incorporated into the measure if desired.

Several empirical uses of the measure were suggested by Weisbrod and Hansen. These include determining the extent of economic inequality and examining the extreme ends of this spectrum (from affluence to poverty), examining regressive and progressive consequences of a tax, and estimating consumption behaviour. Economic inequality was tested using data from United States families in 1962. It was found that the addition of net worth to income increased economic inequality and that the ratio of net worth to income generally increased as income size and age increased. A positive relationship between changes in annuitized assets and consumption was predicted, similar to the life cycle hypothesis formulated by Ando and Modigliani.⁴⁹

APPLICATIONS OF AN INCOME-ASSET MEASURE IN AGRICULTURE

In a study by MacMillan and Loyns which evaluated farm household expenditures,⁵⁰ the income-net worth approach provided an explanatory variable for consumer expenditure. Annuitized asset values were used as

49. A. Ando and F. Modigliani, "The Life-Cycle Hypothesis of Saving: Aggregate Implications and Tests", *AER*, Vol.53 (March 1963) pp.55-84.

50. J.A. MacMillan and R.M.A. Loyns, "A Cross-Section Analysis of Farm Household Expenditures", *CJAE*, Vol.17 #2 (July 1969) pp.92-105.

a proxy for 'expected' or 'lifetime' income. Analysis was done on cross-sectional farm account household budget data from approximately 80 farms from the Carman area in southern Manitoba for 1963 and 1964. As predicted, a significant positive relationship between annuitized asset values and total consumption expenditure resulted.

Using 1966 cross-sectional data from the United States Department of Agriculture, T.A. Carlin used the Weisbrod and Hansen measure to examine economic inequality.⁵¹ Economic well-being of farm families and nonfarm families were compared, along with variation between farms from many geographical regions. Carlin demonstrated the degree to which each of the two components, income and annuitized asset values, contributed to economic well-being over various income and age groups.

Results of Carlin's study closely follow those of Weisbrod and Hansen. The addition of net worth brought economic positions of farm and nonfarm families closer together. An index of integration based solely on money income of .76 became .91. The combined measure improved median economic position of all farm families studied, although to different degrees across geographical regions. As would be expected, where average net worth was highest, average economic position improved the most. Within each region, economic inequality decreased with the inclusion of assets. This result opposes that reached by Weisbrod and Hansen. The

51. T.A. Carlin, "Economic Position of Farm Families when Money Income and Net Worth are Combined", Agricultural Economics Research, Vol. 25 #3 (July 1973) pp. 61-70.

difference is explained by the characteristic net worth/income ratio among farm families, which falls as income increases; the inverse is true when all United States families are considered. This ratio increased as age increased.

There have been more recent studies on the economic well-being of farmers which involve the income-net worth approach.⁵² Of interest here are studies discussing aspects of Canadian farmers' economic position.

In 1972, J.A. MacMillan, Fu-Lai Tung and R.M.A. Loyns used annuitized value of total assets and reported changes in net worth to help detect effects of urbanization on household consumption patterns.⁵³ Data were from a 1968 Manitoba Interlake Area household expenditure survey. Households were grouped according to the degree of urbanization. Results showed annuitized asset values accounted for about 25% of estimated consumption by farm families but only some 8% of urban household consumption.

As mentioned earlier, B.B. Perkins examined effects of annuitized assets and off-farm income as well as farm income when evaluating low returns to agricultural resources.⁵⁴ Using Canadian national data for

52. American studies include: E.C. Budd and D.F. Seiders, "The Impact of Inflation on the Distribution of Income and Wealth", *AER*, Vol.61 (1971) pp.128-138; J.R. Gordon, G.L. Nelson and J.N. Uhl, "The Distributional Impacts of Inflation on Farmers vs Nonfarmers 1960-74", *Am. Soc. of Farm Mgrs. and Rural Appraisers J.*, Vol.40 #2 (Oct. 1976) pp.21-27; P.M. Raup, "Some Questions of Value and Scale in American Agriculture", *AJAE*, Vol.60 #2 (May 1978) pp.303-308.
53. J.A. MacMillan, F.L. Tung and R.M.A. Loyns, "Differences in Regional Household Consumption Patterns by Urbanization: A Cross-Section Analysis", *J. Regional Science*, Vol.12 #3 (1972) pp.417-424.
54. Perkins (1973).

1969, he showed that even when net change in equity was not fully included because of a lack of data, it contributed significantly to eliminating the gap between farm and nonfarm income levels. Perkins also found that off-farm income, a topic to be covered subsequently in this study, was a major source of total money income in 1969.

D. McClatchy and C. Campbell used the income-net worth approach to help determine who low income farmers are and where they are located in 1971.⁵⁵ A concept called 'real farm family income' included, in particular, real capital gains on farm land. Using aggregate Canadian national and provincial data, real capital gains on land contributed roughly 18% of total farm family income in 1971, ranging provincially from lows in New Brunswick and Nova Scotia of 8% to a high in Saskatchewan of 22%. These figures apply after adjustment was made for gains accruing to non-farmer owners of farm land.

G.L. Brinkman and J.A. Gellner included capital gains along with farm income to estimate rates of resource returns for Ontario commercial farms and made a comparison of these with returns to nonfarm resources.⁵⁶ The study recognized that rates of return do not necessarily indicate economic well-being, for even a high rate of return on too few resources may constitute inadequate income from farm sources. The study is limited to commercial farms where adequate resource levels are assumed

55. D. McClatchy and C. Campbell, "An Approach to Identifying and Locating the Low Income Farmer", *CPE*, Vol.10 #2 (April 1975) pp.1-11.

56. G.L. Brinkman and J.A. Gellner, "Relative Rates of Resource Returns for Ontario Commercial Farms—A Farm to Nonfarm Comparison, 1971-1974", *CJAE*, Vol.25 #2 (July 1977) pp.26-44.

Farm/nonfarm returns of the period 1971-74 were presented as ratios, with no adjustments made for inflation. The authors' assumption that "the effects of inflation were similar in each sector in each year"⁵⁷ may be questionable,⁵⁸ especially since rapid land inflation occurred over the period studied.

Findings of the Brinkman and Gellner study suggest capital gains were a positive factor in bringing total returns to farm and nonfarm resources into closer similarity. Capital gains from farm assets exceeded those from nonfarm assets between 1971 and 1974 for those Ontario commercial farms studied. However, returns to labour, management and investment were significantly less for farm resources than for nonfarm.

A new approach to determining changes in owners' equity was developed by G. Bradshaw through his incorporation of income and net worth changes into balance sheet analysis.⁵⁹ He felt that owners' equity changes for several reasons, only one being contributions from farm income, and that knowledge from where equity changes come can help in farm management decisions. Specifically, increases or decreases in asset values due to market pressure have an impact on economic position. Another potential source mentioned by Bradshaw was contributions to equity from off-farm sources. The Canadian literature discussing the role played by off-farm income in the economic well-being of farmers forms the final section of the present review of literature.

57. Brinkman and Gellner, n.l, p.26.

58. See D. Gale Johnson (1961) and Gordon, Nelson and Uhl (1976) who use contrasting views on sectoral distribution due to inflation.

59. G. Bradshaw, "A New Approach to Balance Sheet Analysis", Proc. of Farm Management and Agricultural Appraisal Conf. (July 1978) pp.142-146.

OFF-FARM INCOME⁶⁰

Although off-farm employment⁶¹ has remained in relatively constant proportion to the number of census farms in the period 1941 to 1976, the ratio of off-farm income to net farm earnings has increased substantially over the same period.⁶²

There have been several estimates of the importance of off-farm income to Canadian farmers. T. Manning⁶³ and E.E.R. King⁶⁴ independently estimated farm family income from non-farm sources as approximately 33% of total personal income of farm families in 1958. King noted that if off-farm income were included in income distribution measurements, income inequality among farmers would be less than that normally reported. In 1971, a low farm income year in Canada, off-farm income was reported to be approximately 75% of total farm family income.⁶⁵ The contribution of off-farm employment income, specifically wages and salaries plus non-farm self-employment income, was estimated at 41.7% for 1971.⁶⁶ Another estimate⁶⁷ for the same year showed off-farm income accounting for roughly 40% of total farm family income. Data for this estimate came from the Statistics Canada 1972 Age Enumerative Survey and from farm taxfiler information. These may not include all previously-listed income categories.

60. Defined as: summing wages and salaries, nonfarm self-employment income, investment income, government transfers, and retirement and other income. See R.D. Bollman, "Off-Farm Work by Operators of Canadian Census Farms", *CFE*, Vol.8 #6 (Dec. 1973) pp.1-5.
61. Defined as: participation of farmers in wage activity as distinct from their farming self-employment activity. See R.D. Bollman, *Off-Farm Work by Farmers* (March 1979).
62. This ratio was estimated at 18% in 1940, 36% in 1958 and 74% in 1971. See Bollman (1979) p.60.
63. T.W. Manning, *The Canadian Farm Income Problem* (June 1963).
64. E.E.R. King, "Decreasing Farm Numbers and Incomes", *CFE*, Vol.1 #1 (April 1966) pp.27-29.

Not all provinces shared equally in the distribution of off-farm income. The 1971 ratio of off-farm income to total is lower in the prairie provinces (26% in Manitoba, 20% in Saskatchewan and 36% in Alberta) to relatively higher ones in the Atlantic provinces (Prince Edward Island 40%, Nova Scotia 58% and New Brunswick 53%).⁶⁸

Documentation of off-farm income has been growing.⁶⁹ By 1974, nonfarm income had become over 50% of total farm family income for all provinces except two (Manitoba and Saskatchewan).⁷⁰ The ratio of farm to off-farm income is sensitive to type of commodity produced. Less dependence on off-farm sources of income existed in poultry, dairy, hog, and fruit and vegetable operations.⁷¹

65. B.H. Davey and Z.A. Hassan, "Farm and Off-Farm Incomes of Farm Families in Canada", CFE, Vol.9 #6 (Dec. 1974) p.21 and Bollman (1979) p.60.

66. Bollman (1979) p.141.

67. McClatchy and Campbell, p.5.

68. McClatchy and Campbell, calculated from data in Table 1, p.4.

69. See, for specific years of 1971, 1973, 1974 and 1975 respectively: W. Darcovich, B. Davey, J. Gellner and Z. Piracha, Income Profiles of Farm Taxfilers (July 1975); W. Darcovich, K. Neumeyer, R. Stevenson, Income and Financial Data of Farm Taxfilers 1973 (Nov. 1975); J.A. Gellner and G.J. Birks, Farm and Off-Farm Incomes of Farm Taxfilers, 1974 (July 1977); and W. Darcovich, J. Gellner, D. Leung, Income of Farm Family Units 1975 (May 1979). For general reference see: Paul Shaw, Canada's Farm Population (March 1979); Roger Love, Income Distribution and Inequality in Canada (March 1979).

70. Canada Department of Agriculture, Orientation, p.91.

71. Canada Department of Agriculture, p.91.

SUMMARY

From the early works of T.W. Schultz, discussion about the economic well-being of farmers focussed on two areas of research: income and net worth. Most analyses remained in one of these two areas until the Weisbrod and Hansen measure was published in 1968 to examine the economic well-being of a consumer unit. Subsequently, the income-net worth measure has been used to examine the economic well-being of farmers. Cross-sectional studies appeared, evaluating specific groups of farmers; a time series study was done without adjustment for inflation. The approach was used to reevaluate farm management concepts. Off-farm income also appeared in the literature as having increasing importance to the income component of farm families.

CHAPTER 3

AN INCOME-ASSET MEASURE FOR THE ECONOMIC WELL-BEING OF FARMERS

INTRODUCTION

At the outset of this study, it was stated that two steps are necessary to bring the economic well-being of Canadian farmers into clearer focus. One is to find a meaningful measure for economic position; the other is to use this to examine changes in farmers' economic position. This chapter presents a measure for examination of economic well-being of farmers and assumes data requirements to be ideally realizable. Chapter 4 contains an empirical estimation of the economic position of Canadian farmers in the aggregate, using the measure outlined in this chapter along with limited, secondary data.

Chapter 3 contains three sections. First, an approach is described which combines income and asset values into a single measure. The second section explores how concepts basic to the measure are interpreted with respect to agriculture. The third examines how characteristics of the structure of Canadian agriculture can affect the reality of translating asset values into economic well-being.

SPECIFICATION OF THE MEASURE

Earlier chapters indicated that attempts to understand or measure the economic position of farmers often concentrated on explaining low returns to farm labour. Such studies paralleled use of price and cost variables to explain changes in the structure of agriculture over time. With recognition that farm income alone is an insufficient measure of economic well-being, asset values and off-farm income emerged as additional criteria for evaluating economic position. However, to combine asset values with income flows needed a theoretical framework. This was provided by Weisbrod and Hansen.¹

The Weisbrod and Hansen approach operates on the principle that the economic well-being of a unit is dependent on the flow of services over which it has command. Contributions to this stream come from all sources of current income plus services derived from assets net of liabilities. In order to estimate the contribution of assets to economic position, asset values can be annuitized. This can then be summed with income to arrive at a measure for economic well-being.

Such an income-net worth measure has the form of equation (1).

$$(1) \quad Y_t^* = Y_t + NW_t \cdot A_n$$

-
1. B.A. Weisbrod and W.L. Hansen, "An Income-Net Worth Approach to Measuring Economic Welfare", *AER*, Vol.58 (Dec. 1968) pp.1315-1329.

where: Y_t^* = economic position in time period t
 Y_t = current annual income (net of net worth)
 NW_t = value of assets in time period t less liability
 A_n = annuity formula $\frac{r}{1 - (1+r)^{-n}}$
 r = current rate of interest
 n = life expectancy of the consumer unit

The measure would represent a flow over one year of all income plus an annuity stemming from net worth. The value of the annuity would depend upon the amount of net worth, the length of time over which it is spread (n), and the rate of interest (r). For any given r , the annual annuity would increase if the net worth value in that year is greater or if the period over which it is spread is shorter. For any net worth value, the annuity value would be higher if a higher interest rate were chosen. As the duration of the annuity approaches infinity, the annual value would approach the value of annual interest, which means the measure of economic position would approach current money income (which includes interest and dividend income). If net worth were annuitized in the current year, economic position would equal the sum of current money income plus the current value of all assets.

INTERPRETATION OF THE MEASURE TO AGRICULTURE

The current application of Weisbrod and Hansen's measure requires examination of its basic concepts with respect to the agricultural sector. Characteristics peculiar to agriculture influence interpretation of the income-net worth measure, or some measure which includes asset values, as indicator of farmers' economic well-being. This section discusses modifications to three concepts of Weisbrod and Hansen's measure of consumer economic well-being: the 'unit' under study, the income stream and the annuitization process and then considers, from a Canadian point of view, issues which would influence use of the measure as an indication of Canadian farmers' economic position.

THE FARM 'UNIT'

There are differences in using an income-net worth measure for estimating economic well-being of consumers and using it to estimate the economic position of farmers. Use of the measure with consumers was justified by "recent empirical research that suggests that saving (net worth accumulation) is in large part motivated by a desire to smooth out patterns of normal lifetime consumption and to build up reserves to take care of unanticipated needs"², the argument being that the addition of net worth improves the economic position of a consuming unit at any point in time.

It has been noted that "because the family and the farming unit are the same, labour and capital allocative decisions represent a

2. Weisbrod and Hansen, p.1317/8.

"subjective equilibrium between household and business considerations".³

If the farmer intends to maintain or improve his income level, some portion of his economic position is required for reinvestment in farm operations. For the farmer, the choice to save may be motivated by a desire to improve his consumption options, his productive capacity or both.

It is the economic well-being of farmers as both consumers and producers that is under examination in this study. This includes returns to labour and to physical assets. Over time, changes in economic position indicate changes in what may be called discretionary income of the farm unit. By this it is implied that changes in economic position can be used at the discretion of the farm unit to change household disposable income, or to change investment plans—either farm or off-farm investment—or both.

THE FARM INCOME STREAM

In order to use the Weisbrod and Hansen formula or some other such measure, components would have to be mutually exclusive and additive over a specific time period. All income would have to be expressed in the same quantitative unit, in either actual or estimated currency values. Should the measure be used to compare changes in economic position over time, some adjustment could be made to maintain constancy of the purchasing power of currency. As noted by Weisbrod and Hansen, the income component should be completely independent of net worth to prevent double counting.

3. Mellor (1967), p.37.

Broadly interpreted, income represents a flow of returns from the use of economic resources: land, labour and capital goods. The income of a farm unit results from occupying farm labour and assets either on the farm or off the farm.⁴ There are usually several sources of income to the farm unit. Traditionally, the major source has been income obtained from the sale of farm products. Farm income from cash receipts includes supplementary payments, to which is added income in kind (perquisites in the form of food, house rental and the like) for total farm income. However, income from off-farm employment has accounted for more than half of total income from all sources in the current decade.⁵ Wages and salaries make up the majority of off-farm income. Other sources are: off-farm self-employment, rentals and investment, and family allowances.

Inventory changes may be added to total farm income in the sense that, theoretically, inventory can be sold for cash at any time. However, the assumption that all types of income are additive at any time cannot be made for this category. Inventory changes may not be realized in the year they are recorded; realization may be dispersed randomly throughout the income stream over successive years. Furthermore, inventory can change in value between time periods and, therefore, is not independent of asset values. If it is assumed that inventory changes are realized into cash farm receipts over several years, they need not be a separate income group in the measure of farmers' economic position.

4. "In order to obtain a complete assessment of the welfare position of the farm sector, it is essential to account for income from all major sources: 1) conventional income obtained from the sale of farm products, perquisites, supplementary payments, and unrealized farm inventory changes; 2) off-farm income from employment off the farm and interest, dividends and capital gains from off-farm investments; 3) non-conventional income in the form of capital gains from farm physical assets and liabilities, and from gifts and inheritances." Refer to H.B. Huff and T.J. Cusack, Capital Gains in Canadian Agriculture 1946-66 (1972).

This study treats 'non-conventional income', specifically capital gains from the gross value of farm physical assets, as a separate category not to be included under the definition of income. Ideally, non-conventional income would be net of liability.

ANNUITIZATION OF NET WORTH

To annuitize net worth⁶ implies that benefits from it would flow from an initial period to some specified time in the future. At the end of this time period, it would be assumed that the whole value of net worth would be used up or all of it less a portion intended for bequeathal. A time period appropriately reflecting the lifetime of the unit under study should be chosen and discount rates selected to spread the benefits over time. If changes in net worth were considered, the incidence of change should be calculated at regular intervals over the entire period under study.

The time period chosen should reflect the likely duration over which benefits from asset ownership are spread. Where the unit under consideration is the combination of farm household and farm business, a period approximating a generation in farming would be appropriate, with or without some residual for bequeaths. In Canada, the family farm is the predominant farming unit. Changes in net worth could be calculated annually or at some other regular interval sensitive to changes in economic well-being which are perceived meaningful by farmers.

5. Refer to Chapter 2 of this study, pp.46-47.

6. The empirical estimates of this study use gross farm asset values as a proxy for net worth.

The rate of interest chosen should reflect rates at which credit (or an annuity) can be purchased by the farming community. Interest rates are available to farmers from a variety of sources, including private insurance companies, mortgage and trust companies or individuals, along with provincial and federal government agencies.⁷ Interest rates vary depending on whether credit is extended over a short, intermediate or long term. Some rate or rates should be chosen when estimating the economic position of farmers which reflect this situation in the farm credit market.

THE CANADIAN CONTEXT

Characteristics of the agricultural environment affect realistic interpretation of a measure for economic well-being of farmers which includes income and asset values. Every study will have its own particular aspects of the economic environment which have a bearing on how results can be interpreted. Attention here is given to two structural characteristics—the degree to which farmers rent their land and the credit environment in Canadian agriculture—and to attitudes towards realization of capital gain.

OWNER VERSUS RENTER

Since capital gains accrue to the owner rather than the renter of assets, the proportion of farmer-owned assets, particularly land, becomes significant. Although it is true that land rentals have been on the

7. See: R.S. Rust, "Farm Credit" in various issues of CFE; D. Thompson, Investment Demand for Farm Credit in Canada (1978); F.L. Tung and W.D. Jones, "Forecasting Farm Credit Requirements for 1981", CFE, Vol.14 #3 (June 1979) pp.1-8.

increase in recent years, rented farmland can be owned by farmers. It has been estimated that in 1971, 19.7% of rented farmland was owned by farmers and 80.3% of all farmland was owned by farmers.⁸ Therefore, using the income-net worth approach to measure economic position of farmers would not appear unrealistic. However, on an individual basis, farmers who own assets will be better off than those who do not.

CREDIT AVAILABILITY

The discussion now turns to the question as to what extent changes in capital values are or need to be realized if use of the income-asset value approach is to provide a meaningful estimate of farmers' economic well-being. Weisbrod and Hansen felt that there need be no more than the theoretical possibility of actual annuitization for their method to be valid but appreciated that its practical application would require some credit facility to exist.

Capital value changes can be considered a part of economic well-being to the extent that adequate credit is available to the agricultural sector. This aspect takes on increasing importance: credit requirements of farmers have been growing as more technology is introduced and larger farms are operated by fewer people.⁹ Yet providing credit to farmers has been fraught with difficulties peculiar to agriculture,¹⁰ not the least of which is the variety of needs emanating from a heterogeneous farm structure.

8. McClatchy and Campbell (1975) p.10.

9. Refer, for example, to Rust, and to Lerohl (1967).

10. Federal Task Force on Agriculture (1969) p.343/4.

A number of sources of credit to farmers in Canada exist to help meet various credit requirements. For example, in 1975, there were seven sources of long term credit; twelve offering intermediate term loans and nine institutions for short term loans, a situation which had not changed significantly over three decades.¹¹ Private institutions such as banks have been predominant in short and medium term credit markets, providing approximately 81% of these loans to farmers compared with 6.5% from government sources. Long term loans have been extended largely by government, which accounts for approximately 92.6% compared with 7.4% of long term credit being granted by private institutions.¹¹

Three different credit markets have predominantly different uses to farmers. Farm real estate capital transfers are largely financed through long term credit; intermediate credit terms are used mostly for non-real estate capital purchases such as farm machinery and equipment; and financing farm operating expenses is done primarily through the short term credit market.¹²

It has been noted recently that long term credit demand has been met adequately.¹³ However, escalating farmland values witnessed in the last several years may introduce greater demand in credit markets. Concern has been voiced for the future should the Federal Government, which provides the majority of long term loans through Farm Credit Corporation and the Veterans' Land Act, withdraw from the loans market.¹⁴

11. Rust, particularly (1976) p.21; and Thompson, p.22.

12. Tung and Jones, p.2.

13. Canada Department of Agriculture, p.157.

14. Canada Department of Agriculture, p.157. See also: Thompson, p.105-107 and Tung and Jones, p.8.

Private credit sources have been showing "an increasing capability and interest in agriculture".¹⁵ Banks not only have provided an increasing variety of loan programs to farmers but also have attempted to provide personnel who are versed in the particular problems of agricultural finance.¹⁶ As an indication of the strength of short term credit extension, an increase in short term credit of 2.8 times over the decade 1963 to 1973 was seen, compared with 2.2 times for long term and 2.0 times for intermediate term credit.

The foregoing discussion indicates that there is not sufficient evidence of a lack of credit in Canada to obviate the inclusion of assets in a measure of farmers' economic well-being. Such an assumption does not imply that any change in asset values or net worth may be translated costlessly into income. Indeed, should full realization of asset values occur, the individual farmers would be left without further means of production and, presumably, livelihood. It does imply, however, that changes in net worth constitute changes in economic position which a farmer may adjust at his discretion through investment in productive capacity or personal consumption.¹⁷

REALIZATION OF GAIN

Several technical aspects of realization of a capital gain were touched on in the review of literature. Grove saw an unquestionable increase in purchasing power of an individual who had realized a capital

15. Canada Department of Agriculture, p.156.

16. A. Stuart, representing the Toronto Dominion Bank at a conference on Organization and Direction of our Food System in the 1980s (June 1979).

17. In Shaw (1979), the average value of farm capital in 1971 appeared as the most significant correlate, among some 20 variables, of differentials in magnitude of farm sales, p.116-117 and p.217.

gain. Hoover noted that inflation may limit the addition to purchasing power and felt the gain must not only be realized in the sense that assets are sold but also have financed a completed purchase. It is the position here that as long as gains are potentially realizable in the sense that credit markets do exist for farmers, then they alter economic position by changing discretionary income. However, to look at changes in real rather than nominal terms provides a more accurate account of actual changes in economic position.

Hoover introduced a further complication in his analysis of the effect of changes in net worth on economic well-being. He noted that different interpretations may be given to the impact from expected versus unexpected gains. If expected, a gain may enter the income stream before it is realized (in the form, say, of reduced savings), leading to double counting if both income and changes in the value of net worth are included in estimates of economic position. This point was taken up by D.H. Boyne, who implied that double counting would not occur as long as the gain remained unrealized.¹⁸

This study recognizes the difficulty in assessing the degree to which capital gains and losses are anticipated by Canadian farmers. However, even if expectations lead to a part of the increase in asset values, other forces are at work. For example, in pricing land, there is its productive value based on the value of agricultural production and operating expenses, and its market value which is linked with the former but also includes factors such as scale economies and the non-farm

18. Boyne (1964) p.30.

investor.¹⁹ It was estimated that speculative motives explained approximately 13%-17% of land price increases between 1950 and 1966.²⁰ Farmers' expectations of capital gains have increased between 1949 and 1977,²¹ especially given the rate of land price escalation in the last decade.²² However, the productive value of land has also risen as product prices have increased sharply in recent years. Farm expansion buyers have been considered important forces in increased land prices.²³ Further, there is risk involved with expectation of gain.

SUMMARY

The present chapter has examined the reality of considering asset values as a component along with income in a measure of farmers' economic well-being. It would appear that the inclusion of annuitized assets along with income gives a fuller indication of the economic position of the farm unit, which includes the welfare of both family and business.²⁴ If the income flow is inadequate to fulfill the needs of either family or business aspects or both, adequate credit could be made available to translate net worth into useable capital. Both assets and income are indicative of farmers' economic well-being.

19. See: Tweeten and Martin (1966); Lerohl (1976); and M.E. Andal, "Land Values—Where Are They Going and Why?" Proc. of Farm Mgmt. & Agr. Appraisal Conf. (1978) pp.61-74.
20. Tweeten and Martin, p.391.
21. Lerohl, p.24
22. Andal, p.66; Hoover, p.29; and W.F. Lee and N. Rask, "Inflation and Crop Profitability: How Much Can Farmers Pay for Land?" AJAE, Vol.58 #5 (Dec. 1976) pp.984-990.
23. See: Raup (1978) p.303; or D.G. Harris and R.F. Nehring, "Impact of Farm Size on the Bidding Potential for Agricultural Land", AJAE, Vol.58 #2 (May 1976) pp.161-169.
24. Using net worth would give a more accurate measurement than gross asset values.

CHAPTER 4

ESTIMATION OF THE AGGREGATE ECONOMIC POSITION OF CANADIAN FARMERS

INTRODUCTION

Estimation of the aggregate economic position of Canadian farmers is an object of this study. Conceivably this broad topic could focus on any one of a myriad of levels within the farm sector. Specific income or commodity groups could be examined, for example, or a farm/nonfarm comparison made. It may be the level of economic position which is of interest or the magnitude and direction of its change. The present study estimates the economic well-being of the Canadian agricultural sector, nationally and provincially, from 1949 to 1976.¹

This chapter is divided into three sections. The first examines data sources and weaknesses. The mathematical procedures used to calculate the economic well-being estimates are then detailed. The final section discusses resulting estimates from applying data to the expanded measure of aggregate farm economic well-being.

1. Newfoundland's agriculture sector, which has had less than 1% of occupied farms and of net farm income in Canada since 1949, has been omitted from provincial analysis.

DATA SOURCES AND WEAKNESSES

Estimates of gross farm income, operating expenses and gross asset values published by Statistics Canada form the basis of the data used in this study.² Several other secondary sources are considered as well. Statistics Canada obtains income and asset value estimates by sampling the farm population. Thus, these estimates potentially are subject to sampling errors. Furthermore, the samples depend upon voluntary information which may induce further errors due to inaccurate reporting. Such errors were treated as constants, not entering into the preparation of estimates of economic well-being.

Problems with category definitions were encountered due to changes within the study's time frame. In particular, the category of 'census farm' changed from the 1941 definition in census years 1951, 1961 and 1976; criteria of size and value of agricultural production sold changed most frequently.³ All income and asset value estimates pertain to the specific census farm population defined for each particular year. Components of the asset category 'farm machinery and equipment' changed in quality between the years 1949 and 1976, a factor which is not reflected in the estimates.

It was desired in this study to treat off-farm income as one of the sources of farmers' economic position.⁴ Components of off-farm income, either from employment or from investment, are not included in

2. These appear as appendices to the study, referenced more specifically in later parts of this chapter.

3. R. Daviault, Selected Agricultural Statistics for Canada (June 1977) p.i.

4. See Chapter 2, pp.46-47 for discussion on this topic.

Statistics Canada agricultural estimates. Income tax data contain off-farm income earned by farmers but its availability to the public began only within the current decade. Off-farm income data have now been published for the years 1971, 1973, 1974 and 1975,⁵ covering only a fraction of the present study's time frame. Off-farm non-employment income (government transfers and investment income) has remained a relatively static ratio of total farm family income⁶ and therefore its exclusion should not bias greatly the results. However, exclusion of off-farm employment income will lower the income portion of the estimates by approximately 20% to 75%.⁵ The significance of this component of farmers' economic well-being has only recently been recognized.⁷ Data scarcity precludes inclusion of off-farm income in the present estimates.

Ideally, net worth is the variable to be used when incorporating farm asset values into a measure of economic well-being. Data on farm asset liability in Canada throughout the 28 years covered in this study were not available. Although farmers' equity has remained substantial over the period, debt as a proportion of farm assets has increased since 1949.⁸ This ratio has been estimated at approximately 8.9% in 1951 and 13.6% a decade later.⁹ By 1971, farm debt as a proportion of farm investment was estimated at 18.7%, which ratio fell to 14.9% by 1976,¹⁰ perhaps

5. See n.69, p.47 of this study.

6. Shaw (1979) p.210.

7. See: Bollman (1979); Davey and Hassan (1974); and McClatchy and Campbell (1975).

8. For the period 1949 to 1964, see Lerohl (1967).

9. Estimates for this ratio of 8.9% in 1951 and 13.6% in 1961 appear in Canada Dept. of Agriculture (1977) p.158. This source (p.83) also reported the equity-to-total-asset ratio falling from 87.9% in 1961 to 83.1% in 1971 and that it hovered around this figure for the next few years.

10. A.S. Brunst, "Farm Debt in Canada", *CFE*, Vol.13 #1 (Feb. 1978) p.3.

due to land values increasing at a faster rate than net investment. Results of this study will be biased upward to the degree that gross asset values rather than net worth have been used to calculate annuity values.

THE PROCEDURE

The procedure for estimating the aggregate economic well-being of farmers involves five calculations:

- 1) Y_t Net farm income in any given time period; the sum of all farm income sources less the sum of all operating expenses.
- 2) AV_t Asset values in any given time period; the sum of the current value of all farm asset categories (excluding quota values); not net of liability.
- 3) $AV_t A_t$ Annuitized gross asset values per time period.
- 4) Y_t^* Current dollar estimates for economic well-being.
- 5) Y_t^* Constant dollar estimates for economic well-being.

NET FARM INCOME

For every year and geographical area under study, the income component of economic well-being is calculated using estimates for realized gross farm income less farm operating expenses.¹¹

$$Y_t = I_{\text{gross } y_t} - I_{\text{operating expenses}_t}$$

Gross Farm Income

There are three contributors to gross farm income: farm cash receipts from the sale of farm produce, income in kind, and supplementary

11. Appendices A-1 to A-10 list current dollar estimates for gross farm income and operating expenses used in this study.

payments. Farm cash receipts form approximately 88%-90% of realized gross farm income in any given year,¹² income in kind another 10% and supplementary payments the remaining small fraction. As mentioned previously,¹³ the value of inventory change does not represent a separate contribution to farm income as it is considered to be incorporated into farm cash receipts over a period of time shorter than the 28 years under study.

Farm Operating Expenses

Farm operating expenses can be broken down into several categories.¹⁴ Machinery expenses, and feed and other livestock expenses are both large cost items. The former contributed approximately 24% of total costs in 1949, falling slightly to 20%-22% in 1976. The combined costs for feed and other livestock expenses formed approximately 27% of total in 1949, which proportion also declined to around 20% by 1976. Wages paid to farm labour fell from 13% to under 10% by 1976. The only major expense category which has increased in proportion of total expenses from 1949 is that of fertilizer, lime and other crop expenses, which had doubled by the end of the period from approximately 7.5% in 1949 to 14.5% in 1976.¹⁵

The relationship between asset ownership and operating expenses poses some practical problems in the present study. Typically, depreciation on buildings and machinery is considered an operating expense by

12. Proportions are given for Canada as a whole unless otherwise stated.

13. See p.54 of this study.

14. See the Quarterly Bulletin of Agricultural Statistics, Statistics Canada #21-003 for a full breakdown of operating expenses and their definitions.

15. Proportions calculated from data used in this study.

Statistics Canada. However, here depreciation has not been deducted from gross farm income since the asset component of the economic well-being measure is the annual current dollar estimate for farm asset values. Another consideration is net investment in farming--gross investment (sales) less depreciation charges. Since net investment is made from current income sources yet also is included in gross asset values for the same year, double counting will occur to the extent that investment is not financed by credit. In Canada, data for net investment in agriculture are not available; however, neither are data on off-farm employment nor investment income. Therefore, the present estimates will be biased upward to the extent that net investment in agriculture takes place from farm income sources in any given year.

ASSET VALUES OF FARMERS

This study takes asset value as being the sum of the current gross value of farm assets.¹⁶

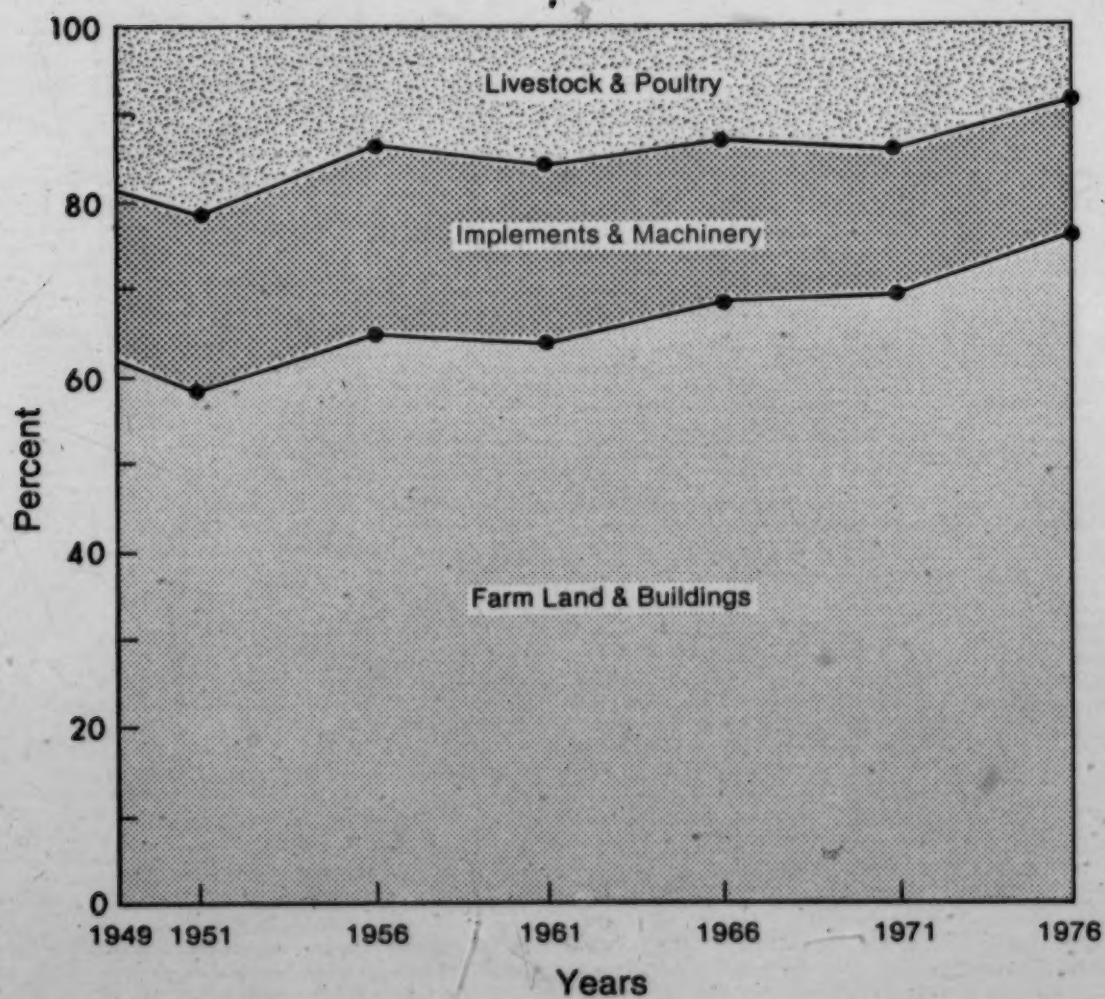
$$AV_t = \text{gross farm asset value}_t$$

The three farm asset categories are: lands and buildings, machinery and equipment, and livestock and poultry. Values of farm land and buildings have formed an increasing proportion of farm asset values in Canada over time. Figure 1 charts the share of each of the three farm asset categories estimated by Statistics Canada for selected years between 1949 and 1976. In 1951, farm land and building values formed 58.4% of total asset values.¹⁷ Values for implements and machinery and for livestock and poultry added almost equal proportions of 20.4% and 21.2% respectively to make up the total. After two decades, land and building values had

16. Appendices A-1 and A-10 list the value of farm assets used in this study.

17. Daviault (1978) p.89.

Figure 1. Proportions of Farm Asset Categories in Canada, Selected Years



Based on proportions appearing in R. Daviault Selected Agricultural Statistics for Canada, Agriculture Canada publication #78/10 (Nov. 1978) pg.89.

an increased share of 70.4%, with the other two categories adding 16.2% and 13.4% respectively. Five years later in 1976, the proportions were 76.2%, 15.0% and 8.8% respectively.

The sum of these three categories of asset values constitutes the annual asset value estimates used in this study (a proxy for net worth).

ANNUITIZED ASSET VALUES

The annuitization process spreads the value of assets over a period of years, allowing consumption of a portion of it in any one year.

$$AV_t A_n \quad \text{where } A_n = \frac{r}{1 - (1+r)^{-n}}$$

In this study, farm asset values are spread over 30 years ($n=30$), which means that the value in any given year would yield an annual annuity ($AV_t A_n$) and be used up at the end of 30 years if no subsequent change in values occurred. Such a change could occur if, for example, net investment or disinvestment is made or if capital values were to change. Changes in the equilibrium price of assets could occur either through market forces or inflation.

Because of the long period under study and different credit arrangements available to farmers, several interest rates have been used to estimate sensitivity of the results. Between 1949 and 1975, Canadian interest rates, weighted to account for the use farmers made of them, averaged 5% for long term credit and 8% for short term credit.¹⁸ The ranges were 1.45% - 7.8% and 4.5% - 11.4% respectively.

18. Calculated from rates found in Thompson (1978) p.72.

This study has used three interest rates: 0%, 5% and 10%.¹⁹ A rate approaching zero would imply that there is little addition to asset values over the annuity period. If annuitized, the value of assets would be used up in equal annual installments. The annuity formula, A_n , is undefined when r is exactly zero. Various interest rates can be used to calculate annuities annually at current asset values. The higher the interest rate, the more the asset can earn before it is used up, thus bringing a higher annual annuity value.

CURRENT DOLLAR ESTIMATES FOR ECONOMIC WELL-BEING

Current dollar estimates for the economic well-being measure which takes asset values into consideration are obtained by summing the current income component and the annuity value calculated from current asset values.²⁰

$$Y_t^* = Y_t + AV_t A_n$$

Each estimate represents economic position at any point in time. However, changes do not necessarily indicate changes in real economic position as the purchasing power of current dollar estimates will change with changing values of the dollar.

CONSTANT DOLLAR ESTIMATES FOR ECONOMIC WELL-BEING

Putting current dollar estimates into constant dollar terms allows for comparison of real economic position over time.²¹

$$\bar{Y}_t^* = Y_t^* \cdot \frac{100}{\text{price index}}$$

19. Appendices B-1 to B-3 list current estimates for annuitized gross asset values calculated for this study using various interest rates.
20. Listed in Appendices C-1 to C-3.
21. Listed in Appendices D-1 to D-4.

The index interprets current collars into dollars whose purchasing power stays the same over time. Many such indices exist to translate dollars into the purchase of specific items—either consumption or investment goods. The difficulty in separating farmers' investment decisions from their consumption decisions has been discussed earlier.²² It has been indicated also that structural change in agriculture has brought the farming community into closer touch with the wider economic environment. This study has chosen the Consumer Price Index (CPI) as a deflator for the above reasons and also because it is a commonly-accepted index of inflation in Canada.²³

The estimates resulting from this step represent annual levels of aggregate economic position of Canadian farmers, excluding the important components of off-farm income and quota values and including both asset equity and liability. Changes in this level represent real changes in the purchasing power of the agricultural sector, with a bias toward purchases for consumption goods because of the use of the CPI.

ESTIMATED ECONOMIC POSITION OF CANADIAN FARMERS

AGGREGATE NET FARM INCOME AND ECONOMIC POSITION

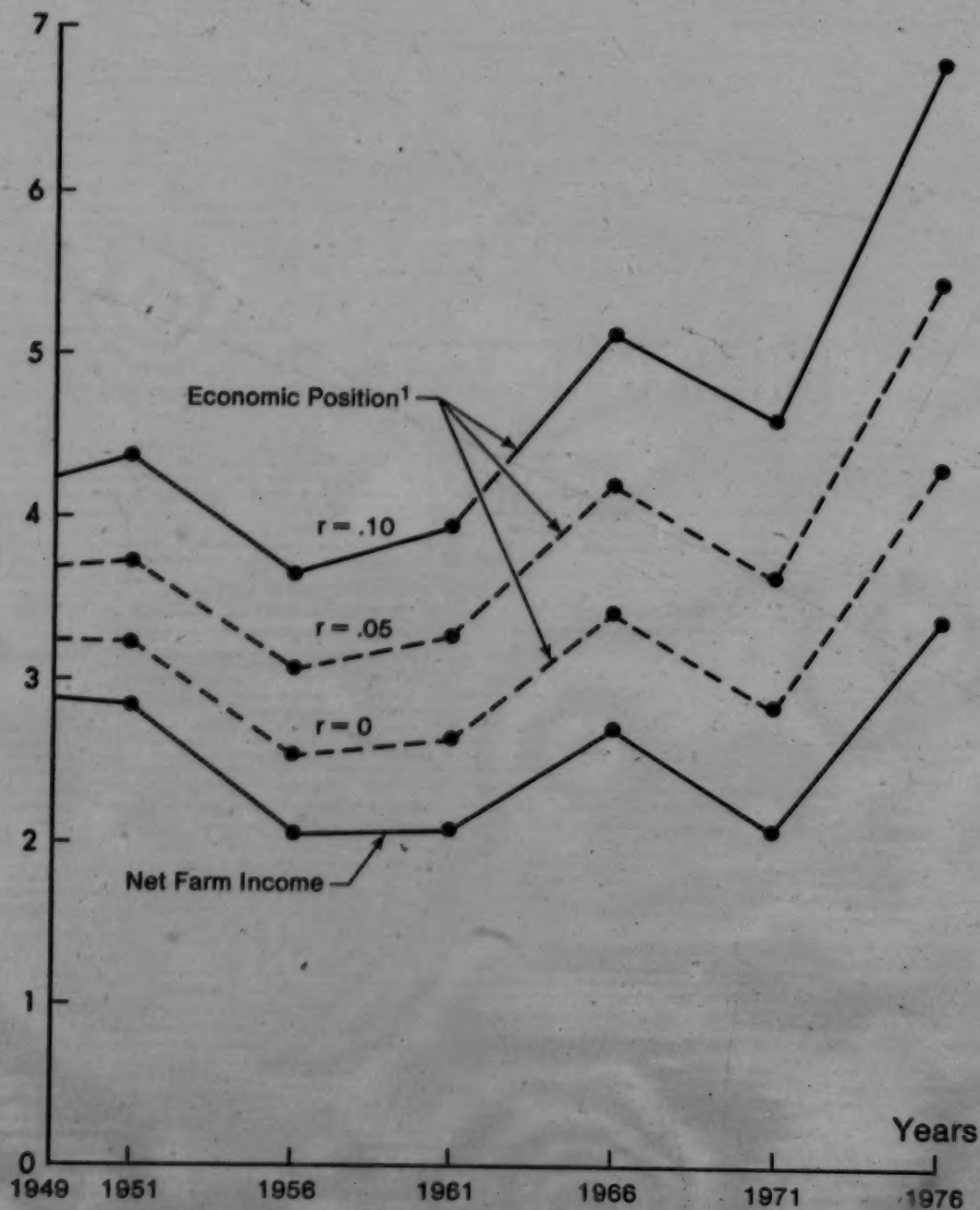
Figure 2 presents four estimates of Canadian farmers' aggregate economic position for 1949 and selected census years to 1976. Annual estimates from 1949 to 1976 inclusive for Canada and the provinces (excluding Newfoundland) are presented as Appendix D of this study. In

22. See pp.52-53 of this study.

23. Darcovich, Gellner and Leung (1979) p.18.

Figure 2. Estimates of Real Net Farm Income and Real Economic Position in Canada, Selected Years

\$ Billion (1971=100)



Based on data on gross farm income, operating expenses and asset values from Statistics Canada, *Quarterly Bulletin*, Catalogue #21-003, Ottawa (April - June selected years); the deflator is the Consumer Price Index, 1971 = 100.

1. Economic position includes net farm income plus an annuity calculated from farmers' asset values at interest rates as indicated over a 30-year period.

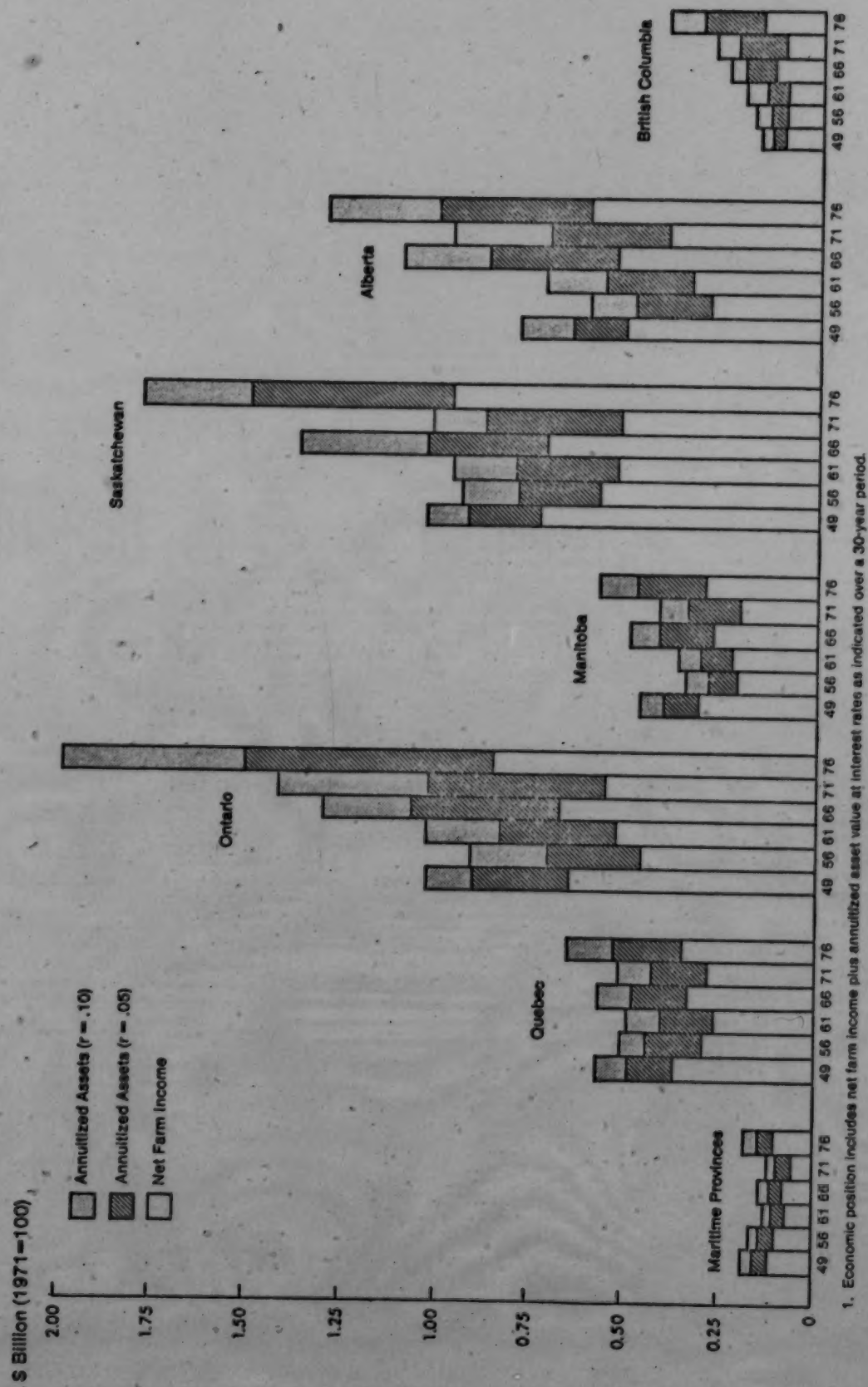
Figure 2, estimates of net farm income obtained from Statistics Canada surveys are compared with three estimates of Canadian farmers' economic position calculated in this study. These estimates are expressed in real 1971 terms. Three estimates of economic position are based on net farm income and on farm asset values which have been annuitized over a 30-year period using annual interest rates of 0%, 5% and 10%. These estimates do not include estimates of off-farm income or quota values; nor do they exclude asset liability.

From Figure 2, it can be seen that Canadian farmers' economic position has improved in real terms since 1949. Using the real net farm income measure, 1949-51 levels were not reached again until the mid-1970s. Real net farm income fell sharply in the early 1950s and again after 1966. In 1971, real net farm income fell to its lowest point for the entire period. When farm asset values are included as a contributor to economic well-being, 1949-51 levels were at least matched by the mid-1960s. The declines in the early 1950s and in the late 1960s were not as sharp as the drops in real net farm income alone but estimates from this measure proceeded to increase at a faster rate than income after 1971. The income-asset value estimates reached their lowest point in 1956.

The provinces of Canada have not shared equally from improvement in farmers' economic position.²⁴ Both the level of aggregate farm economic position across provinces and its variability over time can be seen from Figure 3. This chart shows the geographical distribution of real net farm income and economic position, which includes annuitized

24. As noted earlier, Newfoundland, which has had less than 1% of occupied farms and of net farm income in Canada since 1949, has been omitted from provincial analysis.

Figure 3. Geographical Distribution of Real Net Farm Income and Real Economic Position¹, Selected Years



asset values, for the selected years between 1949 and 1976. The estimates represent real positions, based on 1971 prices. The shaded areas show to what extent the measure of economic position has been increased by the inclusion of annuitized gross asset values. A distinction has been made between two interest rates used in the annuity calculation.

Ontario, Saskatchewan and Alberta all started from higher levels of aggregate net farm income and economic position than other provinces and increased their share of these relative to other provinces over time. In 1949, aggregate net farm income and also economic position was highest in Saskatchewan. In 1966, Saskatchewan's income and economic position levels were again marginally higher than those of Ontario but by 1971, the large asset component in Ontario had raised this province's economic position above that of Saskatchewan and by 1976, Saskatchewan's relatively large income contribution but smaller asset value left Ontario's share of aggregate farm economic position largest in Canada. Alberta's net farm income share moved in the same direction as that of Ontario for all years shown but where the addition of Ontario's asset component maintained an increase in economic position in 1971, Alberta's economic position fell for this year relative to the 1966 estimate. Alberta's economic position rose above the 1966 estimate by 1976, due to changes in both net farm income and asset value.

The addition of asset values to a measure of economic position increased British Columbia's economic position relative to its net farm income level more than any other province. British Columbia had only a

slightly larger aggregate net farm income after the 26-year period while its economic position increased substantially. Both Quebec and Manitoba were left with a slightly lower net farm income and a slightly higher economic position in 1976 as compared with 1949.

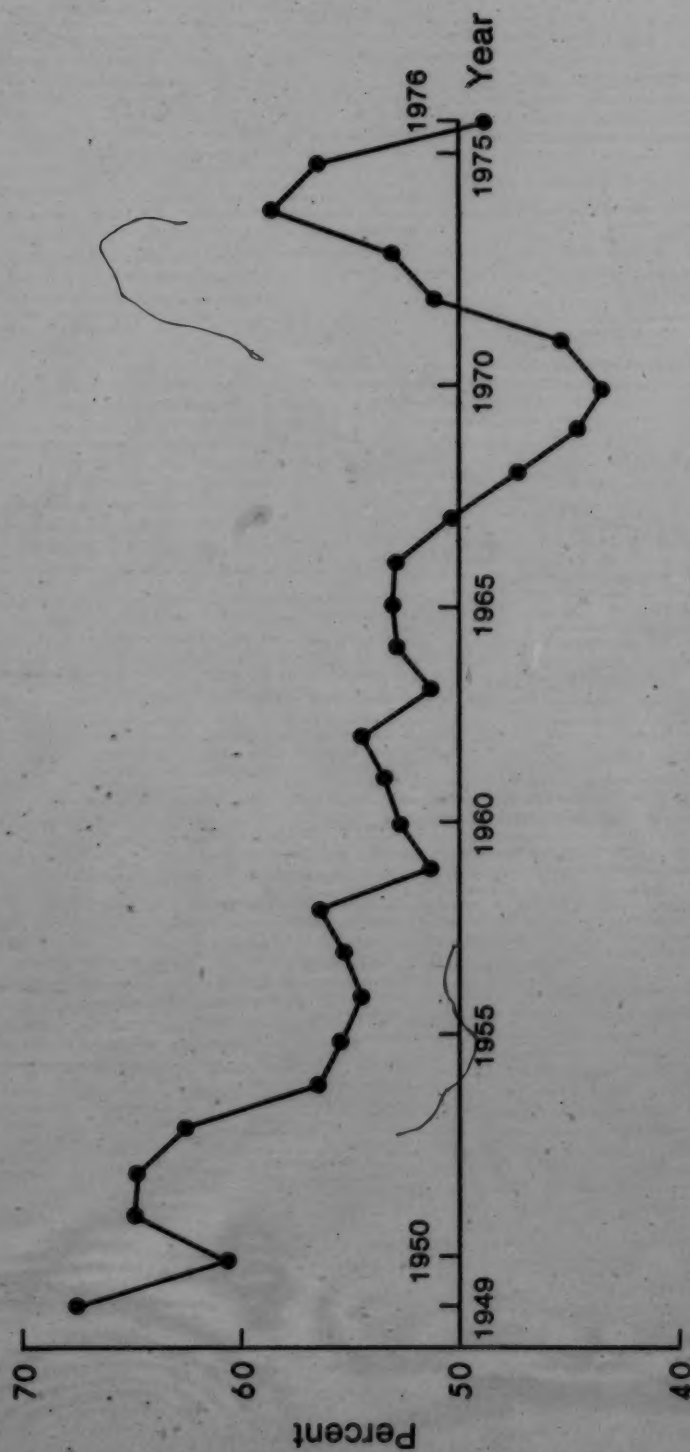
As a group, Maritime farms have shown real declines in both net farm income and economic position between 1949 and 1976, although increases in 1976 brought them very near 1949 levels. This grouping masks what for Nova Scotia and New Brunswick are even lower estimates of net farm income and economic position as the farm sector in Prince Edward Island experienced real increases in net farm income and the annuitized asset component since the early 1970s.²⁵

PROPORTION OF NET FARM INCOME TO ECONOMIC POSITION

In Canada as a whole, both real net farm income and asset values have been increasing but the latter has been increasing at a faster rate. Figure 4 shows the proportion of real net farm income to a measure which includes annuitized real asset values along with net farm income in Canada from 1949 to 1976. At the 50% level, real net farm income and real annuitized asset values each would contribute equally to the measure of economic position. An estimate above the 50% line implies real net farm income contributes the majority share to economic well-being; one below indicates the asset portion is the larger contributor. In this diagram, annuity values have been calculated using a 10% rate of interest which, if interest rates were lower throughout the period, biases the

25. Refer to Appendices D-1 to D-4 for a breakdown of the Maritimes into provincial estimates.

Figure 4. Proportion Real Net Farm Income to Economic Position¹ Canada



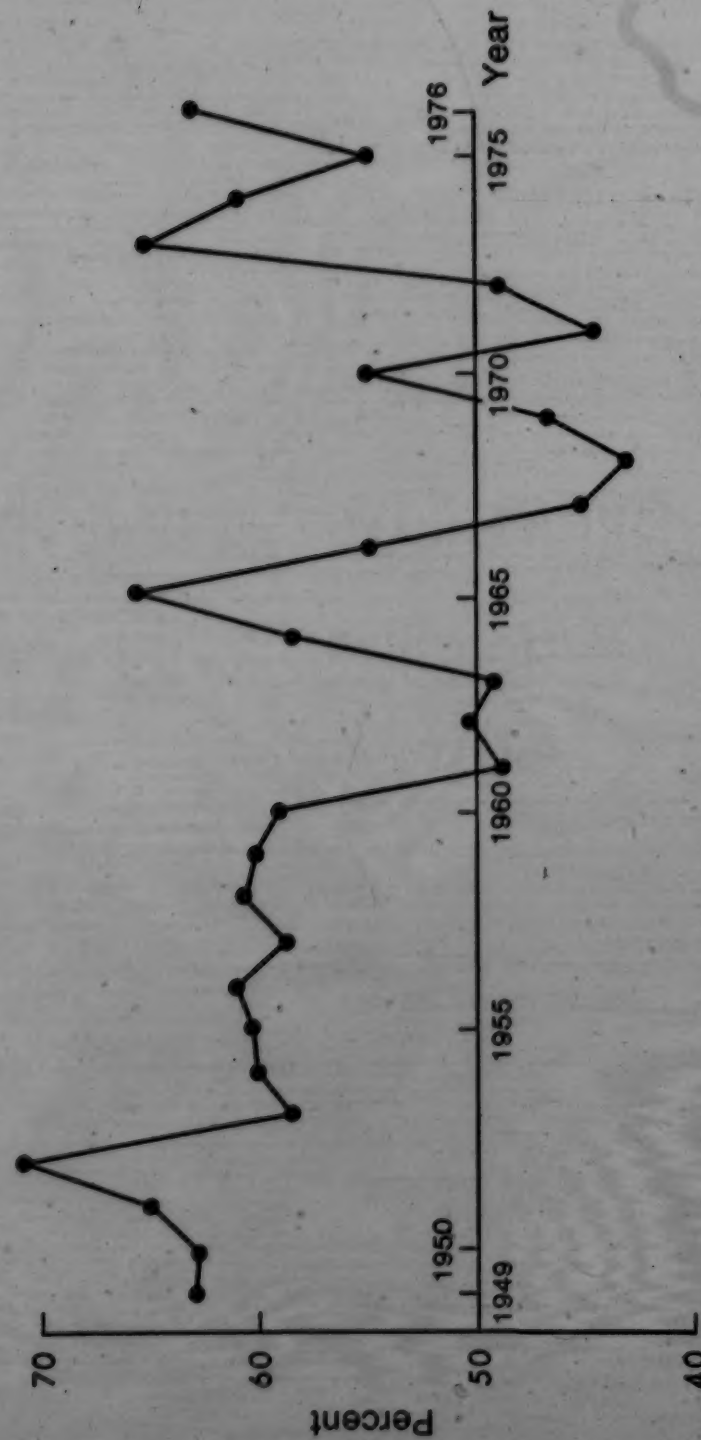
1. Economic position includes net farm income plus an annuity calculated from farm asset values at a 10% rate of interest over a 30-year period. Proportion is calculated using constant dollar values of income and asset value estimates published by Statistics Canada in the Quarterly Bulletin, Catalogue #21-003 (April - June various years).

estimates in favour of asset values playing the larger role; the opposite would be true if interest rates were higher than those assigned. Thus, in earlier years, the estimates would likely be higher than indicated and in later years they would likely be closer to or below those shown.

Figure 4 indicates a relatively steady decline in real net farm income's share in economic position as measured here. Except for what may be the influence of high grain prices in the early 1970s, asset values have contributed more than 50% of estimated real economic well-being since the late 1960s. The drop in income's share after 1974 may be a combination of increased investment on farms, perhaps aided by increasing incomes, and rapidly increasing farm land prices, growing at a rate faster than grain prices.

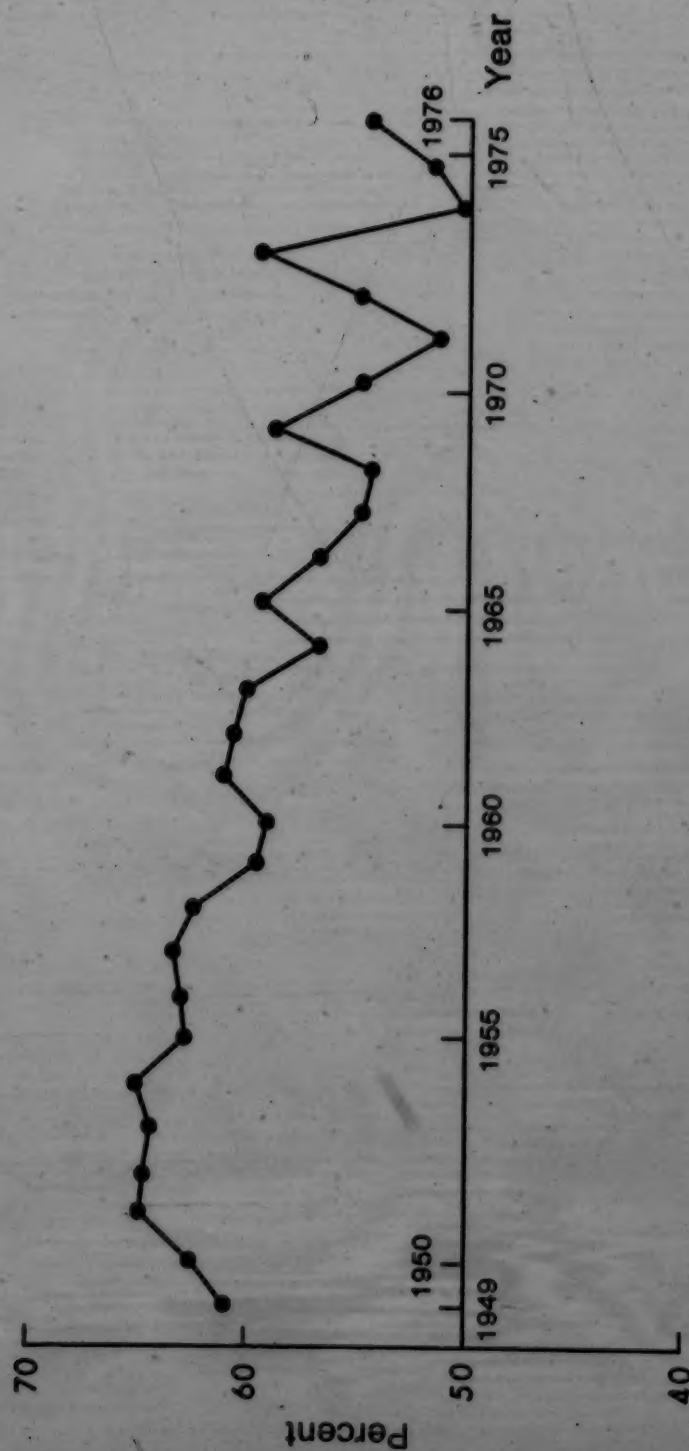
Most provinces in Canada have shown a similar change in the proportion of real net farm income as a ratio of a measure which includes annuitized real asset values. However, the importance of net farm income to total economic position as calculated in this study has varied among provinces. Figures 5 to 13 show the proportion of real net farm income to real economic position (the annuity portion of which has been calculated using a 10% rate of interest) for provinces in Canada.

Figure 5. Proportion Real Net Farm Income to Real Economic Position¹ Prince Edward Island



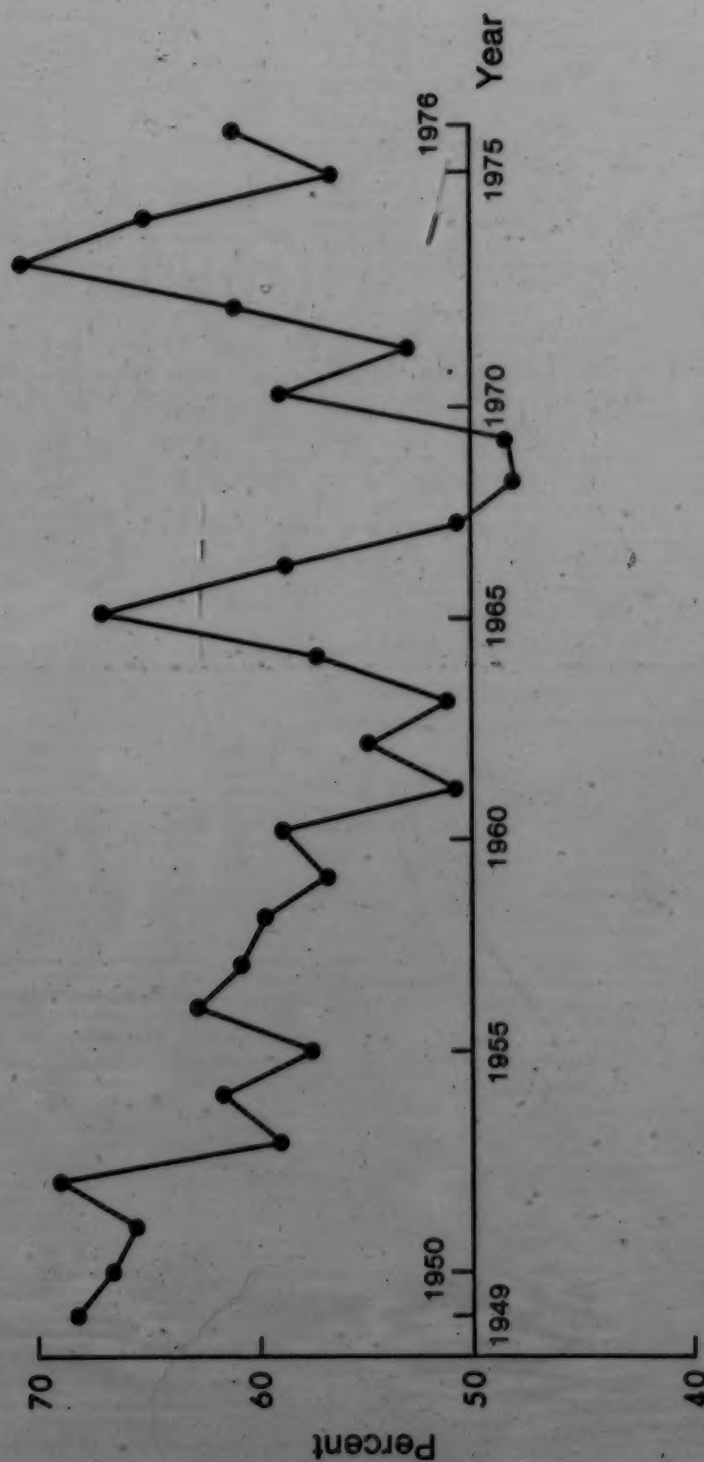
1. Economic position includes net farm income plus an annuity calculated from farm asset values at a 10% rate of interest over a 30-year period. Proportion is calculated using constant dollar values of income and asset value estimates published by Statistics Canada in the Quarterly Bulletin, Catalogue #21-003 (April - June various years).

Figure 6. Proportion Real Net Farm Income to Real Economic Position¹ Nova Scotia



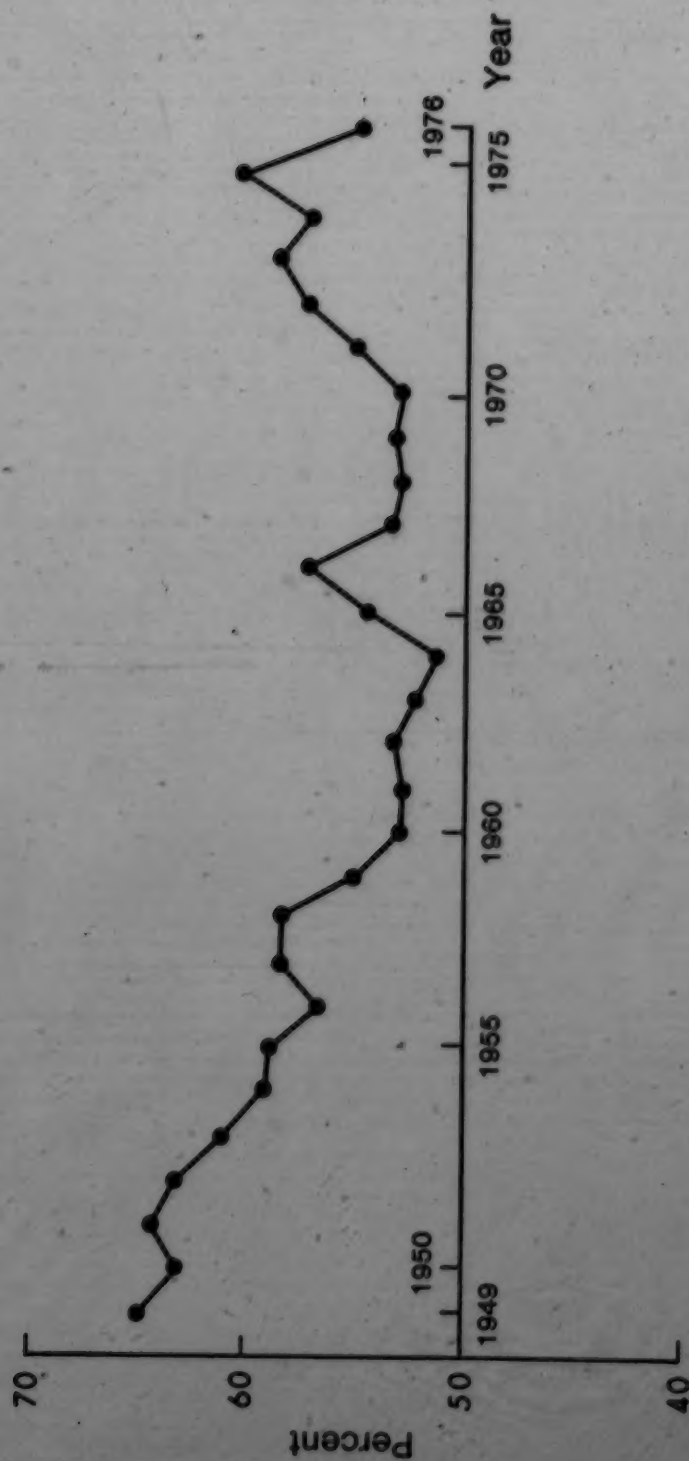
1. Economic position includes net farm income plus an annuity calculated from farm asset values at a 10% rate of interest over a 30-year period. Proportion is calculated using constant dollar values of income and asset value estimates published by Statistics Canada in the Quarterly Bulletin, Catalogue #21-003 (April - June various years).

Figure 7. Proportion Real Net Farm Income to Real Economic Position¹ New Brunswick



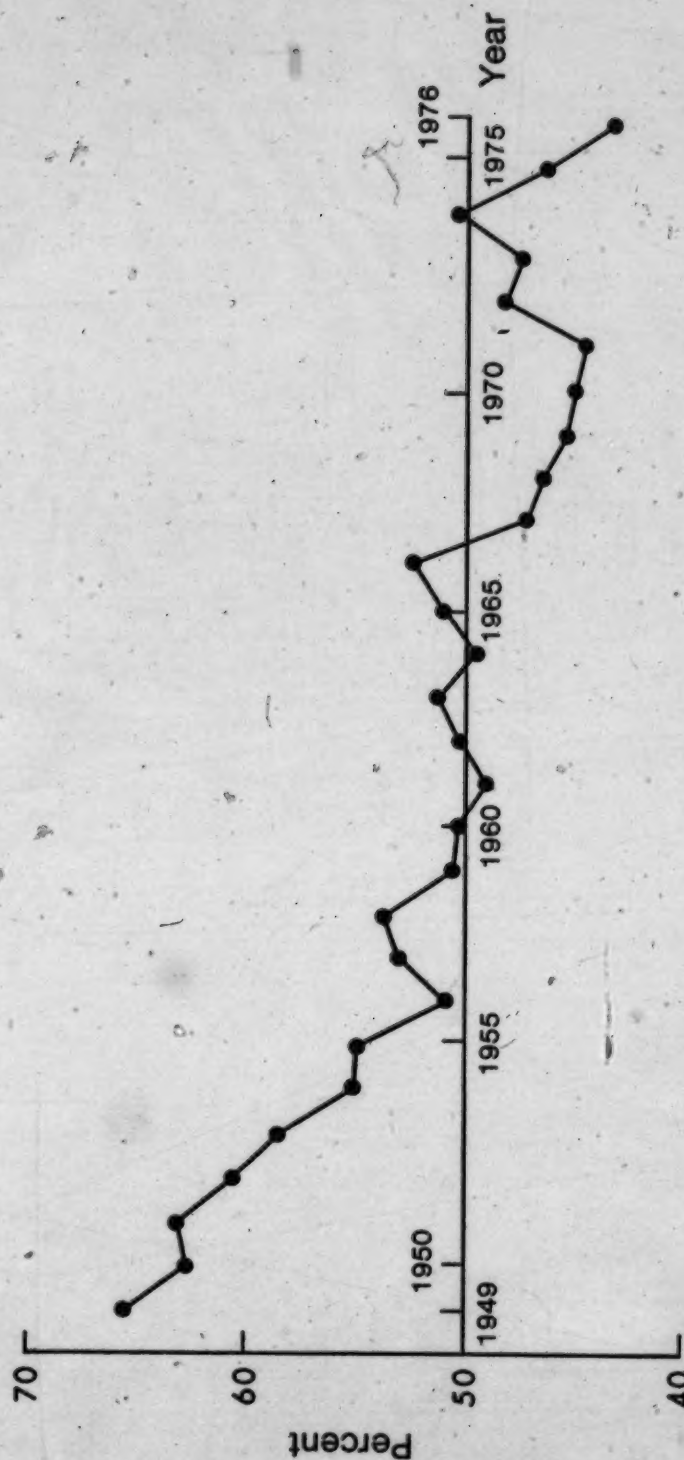
1. Economic position includes net farm income plus an annuity calculated from farm asset values at a 10% rate of interest over a 30-year period. Proportion is calculated using constant dollar values of income and asset value estimates published by Statistics Canada in the *Quarterly Bulletin*, Catalogue #21-003 (April - June various years).

Figure 8. Proportion Real Net Farm Income to Real Economic Position¹ Quebec



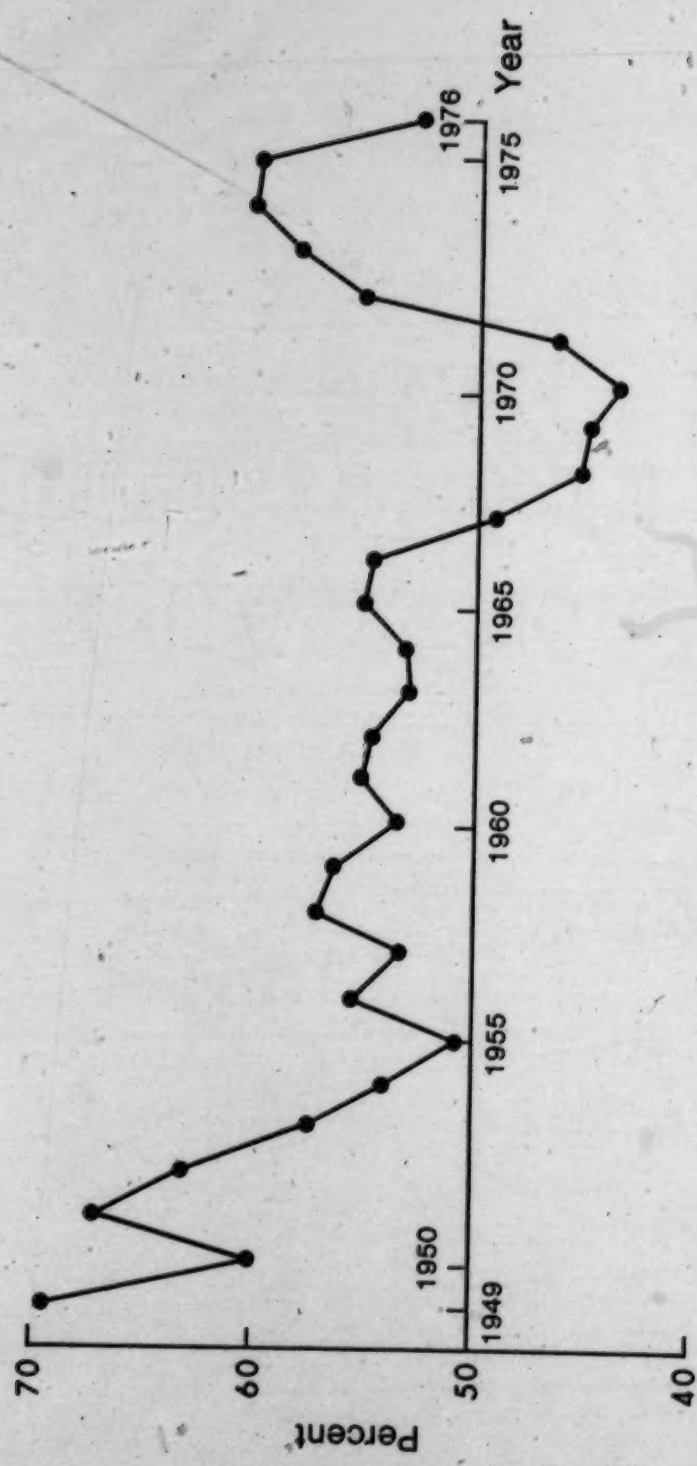
1. Economic position includes net farm income plus an annuity calculated from farm asset values at a 10% rate of interest over a 30-year period. Proportion is calculated using constant dollar values of income and asset value estimates published by Statistics Canada in the *Quarterly Bulletin*, Catalogue #21-003 (April - June various years).

Figure 9. Proportion Real Net Farm Income to Real Economic Position¹ Ontario



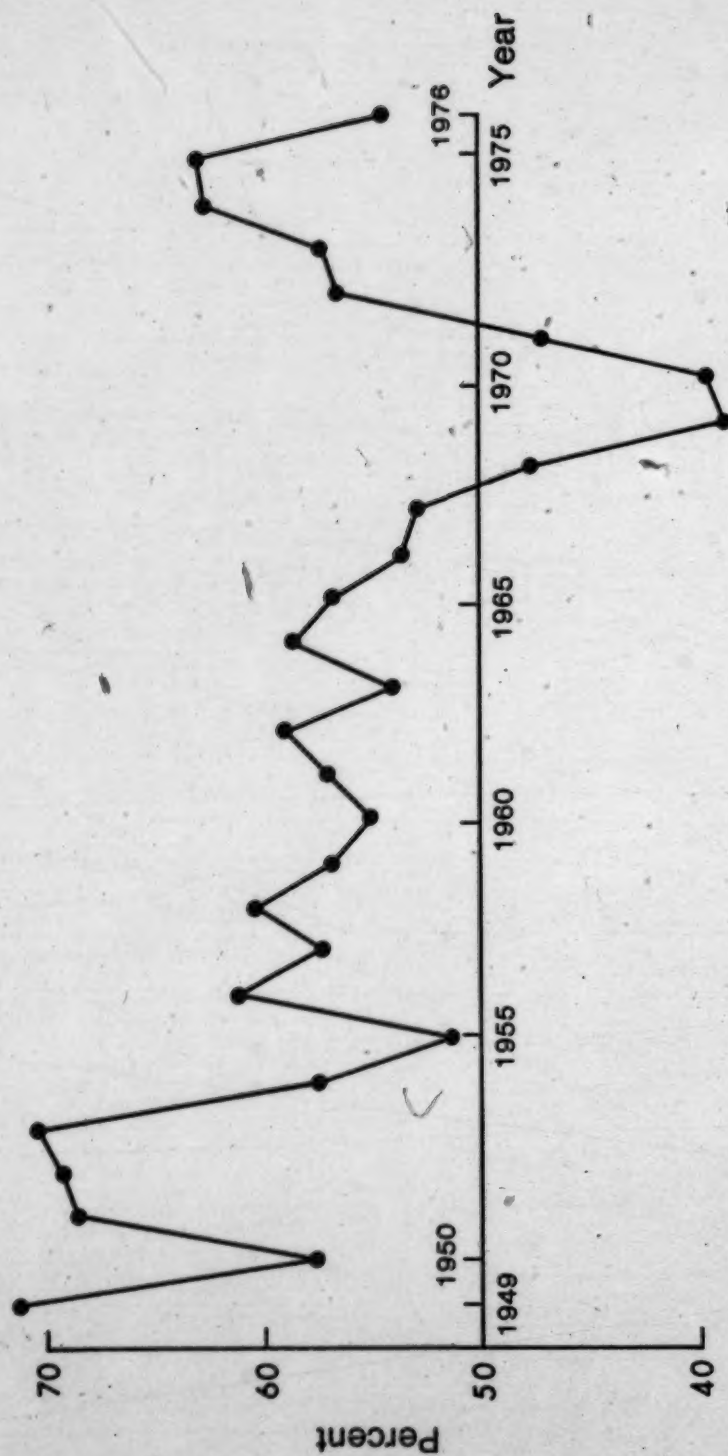
1. Economic position includes net farm income plus an annuity calculated from farm asset values at a 10% rate of interest over a 30-year period. Proportion is calculated using constant dollar values of income and asset value estimates published by Statistics Canada in the Quarterly Bulletin, Catalogue #21-003 (April - June various years).

Figure 10. Proportion Real Net Farm Income to Real Economic Position¹ Manitoba



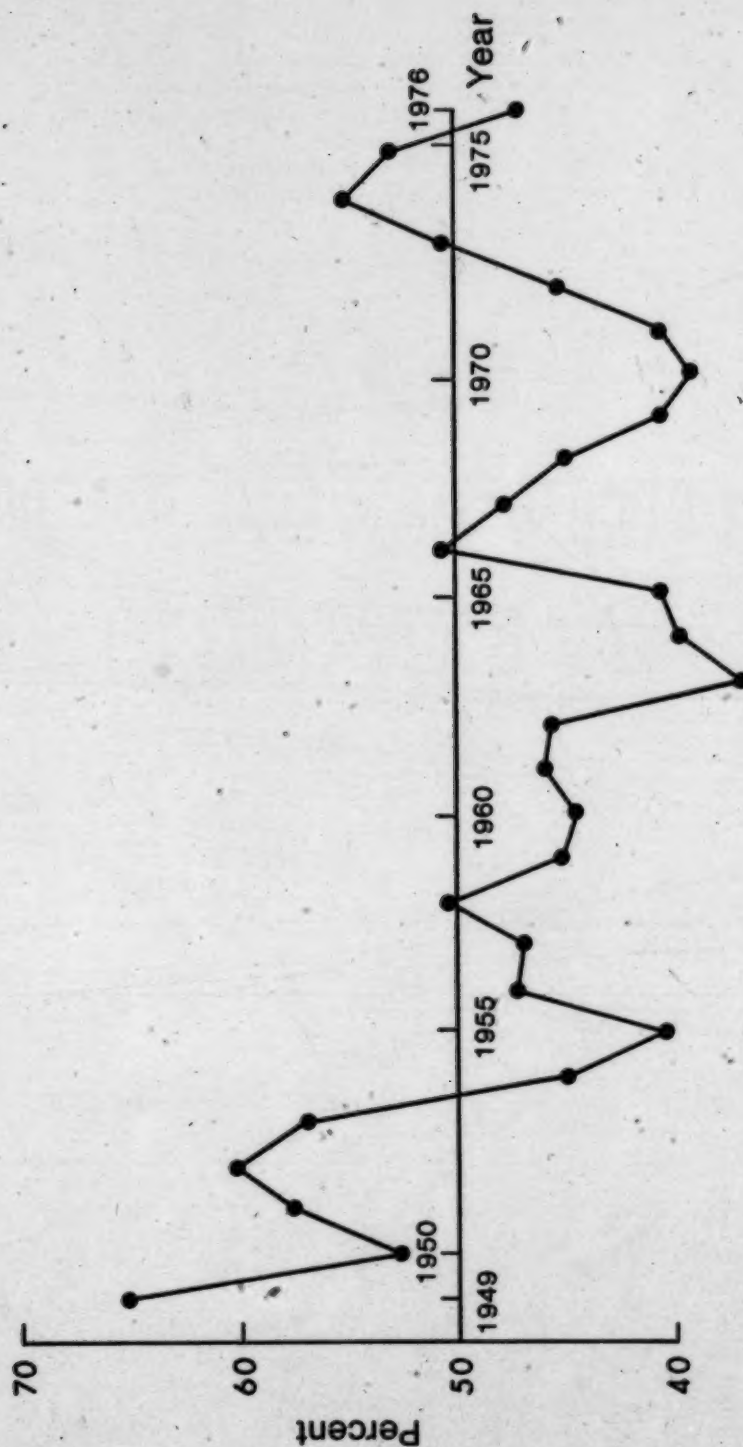
1. Economic position includes net farm income plus an annuity calculated from farm asset values at a 10% rate of interest over a 30-year period. Proportion is calculated using constant dollar values of income and asset value estimates published by Statistics Canada in the Quarterly Bulletin, Catalogue #21-003 (April - June various years).

Figure 11. Proportion Real Net Farm Income to Real Economic Position¹ Saskatchewan



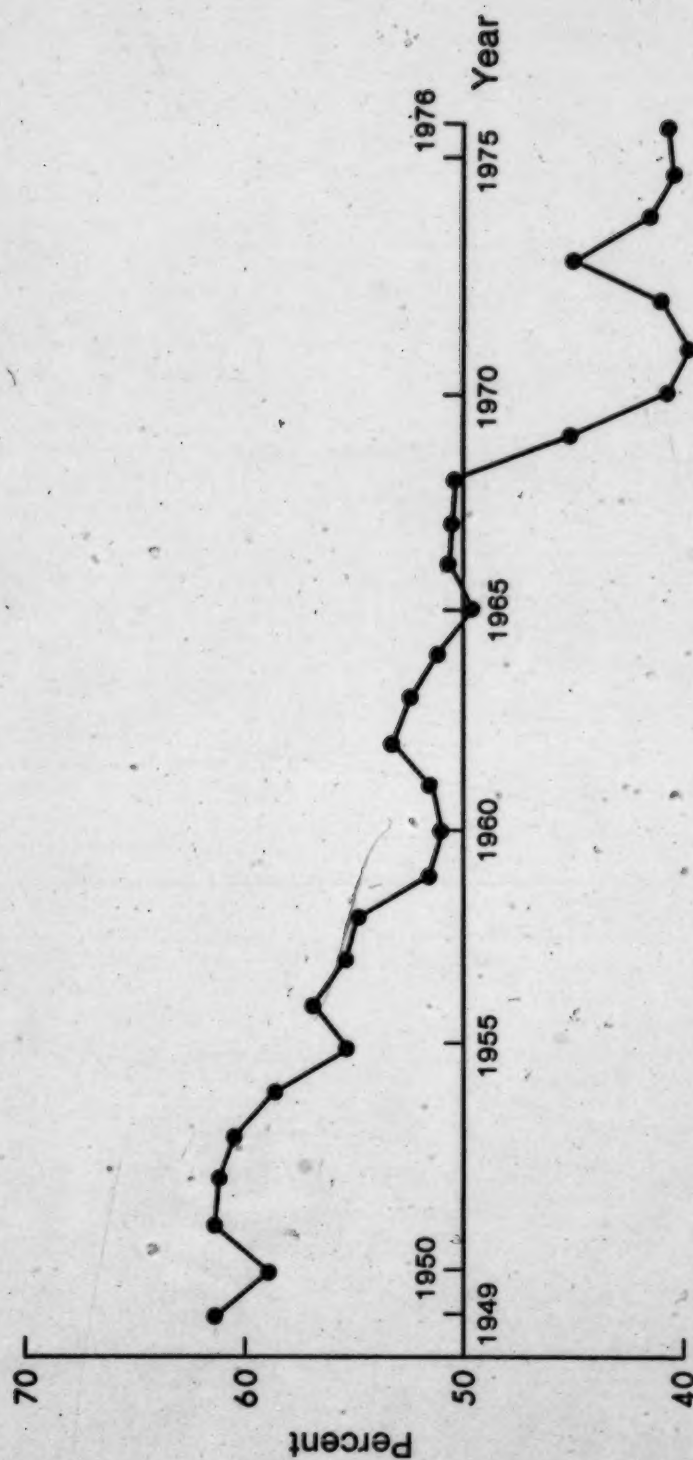
1. Economic position includes net farm income plus an annuity calculated from farm asset values at a 10% rate of interest over a 30-year period. Proportion is calculated using constant dollar values of income and asset value estimates published by Statistics Canada in the Quarterly Bulletin, Catalogue #21-003 (April - June various years).

Figure 12. Proportion Real Net Farm Income to Real Economic Position¹ - Alberta



1. Economic position includes net farm income plus an annuity calculated from farm asset values at a 10% rate of interest over a 30-year period. Proportion is calculated using constant dollar values of income and asset value estimates published by Statistics Canada in the Quarterly Bulletin, Catalogue #21-003 (April - June various years).

Figure 13. Proportion Real Net Farm Income to Real Economic Position¹ British Columbia



1. Economic position includes net farm income plus an annuity calculated from farm asset values at a 10% rate of interest over a 30-year period. Proportion is calculated using constant dollar values of income and asset value estimates published by Statistics Canada in the Quarterly Bulletin, Catalogue #21-003 (April - June various years).

Widely fluctuating incomes in Prince Edward Island, New Brunswick, Saskatchewan, and to a lesser extent Alberta make it unclear as to whether there is a trend towards a lessening proportion being attributed to net farm income in these provinces.²⁶ The case for Alberta is atypical since asset values have formed the major proportion of the economic well-being measure since the early 1950s.

The real net farm income proportion in Nova Scotia and Quebec shows a slightly downward trend, although it remained above the 50% line from 1949 to 1976.

The proportion of real net farm income in Ontario and British Columbia decreased markedly between 1949 and 1976. After falling sharply in the 1950s, between 1960 and approximately 1966, net farm income was an equal contributor to economic position in these provinces. By 1968, annuitized asset values contributed over 50% to the present measure of economic position. Subsequently, the ratio of net farm income to economic position as calculated here remained at or below 50%, although when grain prices were relatively high in the early 1970s, the proportion of net farm income increased somewhat.

26. These income changes may stem from similarities in types of commodities produced in these provinces and/or similarities in markets for their products (such as a dependence on variable export markets and fewer market alternatives than elsewhere).

Manitoba and Saskatchewan show similar patterns of change in the proportion of real net farm income to the present economic well-being estimates. Net farm income came close to equal proportions with annuitized asset values in 1955 and hovered above the 50% level for about a decade. During the late 1960s and early 1970s, annuitized asset values took on the majority role until the grain prices in the 1970s raised farm incomes above previous levels. As for Canada as a whole, the drop in 1975 of net farm income share could be explained by increased farm investment and/or rising values of assets, particularly land values.

DISTRIBUTION OF CENSUS FARMS AND ECONOMIC POSITION

So far the discussion has focussed on national and provincial shares of aggregate net farm income and asset values without considering the distribution of occupied farms throughout Canada. Criteria for the definition of a census farm in Canada changed between 1949 and 1976.²⁷ Using the 1976 definition of census farm for the 28 years under study, Figure 14 shows the number and proportion of occupied farms in Canada in 1951 and again in 1976. Except for British Columbia, the absolute number of census farms has declined over the period. As well, there has been a general transfer from east to west in provincial distribution of census farms.

27. See p.63 of the present study for information on these changes.

Figure 14. Number and Proportion of Occupied Farms¹ in Canada², 1951 and 1976

The Atlantic Provinces →						B.				
						C.				
						→ 3.1%				
1951	→ 5.2%	→ (19,973)	→	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	→ (58,092)	→ (12,002)
				18.3%	27.4%	9.6%	21.4%	15.0%		
				(70,790)	(105,956)	(37,363)	(82,894)			
The Atlantic Provinces →						B.C.				
						→ 4.3%				
						→				
1976	→ 3.4%	→ (10,137)	→	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	→ (57,310)	→
				14.4%	25.6%	10.0%	23.2%	19.1%		
				(43,097)	(76,893)	(29,963)	(69,578)			

Based on Proportions appearing in R. Daviault, Selected Agricultural Statistics for Canada, Agriculture Canada publication #78/10 (Nov. 1978) p.6.

1. Census farm defined as a census farm in the 1976 Census of Agriculture : all farms of one or more acres of land and \$1200 or more gross sales of agricultural products.

2. Including Newfoundland.

Table 1 shows the percentage distribution in Canada of census farm numbers, real net farm income and economic position (which includes farm asset values annuitized at a 10% rate of interest) for selected years from 1951. It is reasonable to find farm numbers shifting in accordance with agricultural and overall economic opportunities. As noted above, absolute farm numbers have declined and the proportion of farms in Canada has shifted slightly towards the western provinces since 1951. This can be seen in Table 1, where the percentage of farm numbers decline for every province east of Manitoba and increase from Manitoba westward over time.

Typically, changes in provincial distribution of measures of economic well-being have been correlated with changes in the distribution of census farms in Canada. Notable exceptions are Ontario and Manitoba. The proportion of census farms declined in Ontario, while its share of economic well-being measures, especially the measure which includes annuitized asset values, increased. The opposite is true in Manitoba, where its proportion of census farms increased at the same time as measures of economic well-being were falling. A reason for this situation may be that in Manitoba, it is relatively more difficult for farmers to shift entirely to off-farm employment due to fewer off-farm opportunities and/or higher costs of shifting than in Ontario. Prince Edward Island is another anomaly, where its proportion of farm numbers declined steadily but its share of measures of economic well-being fluctuated over the period.

TABLE 1

PERCENT DISTRIBUTION OF CENSUS FARM NUMBERS,¹ REAL NET FARM INCOME²
AND REAL ECONOMIC POSITION³ ACROSS CANADA,⁴ SELECTED YEARS

YEAR	% FARM NUMBERS	% NET FARM INCOME	% ECON. POSITION	YEAR	% FARM NUMBERS	% NET FARM INCOME	% ECON. POSITION
Prince Edward Island				Ontario			
1951	1.4	.9	.9	1951	27.4	25.2	25.8
1961	1.3	.6	.7	1961	25.5	24.3	26.3
1966	1.3	.7	.7	1966	25.2	24.7	25.1
1971	1.1	.6	.7	1971	25.2	27.2	28.1
1976	1.0	1.1	.8	1976	25.6	25.2	28.4
Nova Scotia				Manitoba			
1951	1.7	1.6	1.6	1951	9.6	10.9	10.5
1961	1.4	1.5	1.3	1961	9.5	9.6	9.2
1966	1.3	1.0	.9	1966	9.8	9.8	9.5
1971	1.2	1.1	1.0	1971	9.9	8.8	8.7
1976	1.2	.9	.8	1976	10.0	9.0	8.3
New Brunswick				Saskatchewan			
1951	2.0	1.7	1.7	1951	21.4	24.7	23.4
1961	1.5	1.0	1.0	1961	23.3	25.4	23.7
1966	1.3	1.0	.9	1966	23.4	26.6	26.2
1971	1.1	1.0	.8	1971	23.8	24.4	23.6
1976	1.1	1.1	.8	1976	23.2	28.9	26.2
The Maritime Provinces				Alberta			
1951	4.8	4.2	4.6	1951	15.0	14.1	15.8
1961	4.2	3.2	3.1	1961	16.6	15.5	17.9
1966	3.9	2.7	2.5	1966	17.3	19.8	20.9
1971	3.4	2.7	2.5	1971	17.8	18.2	20.2
1976	3.3	3.1	2.4	1976	19.1	18.3	19.1
Quebec				British Columbia			
1951	18.3	14.3	14.5	1951	3.1	3.8	4.0
1961	17.7	12.4	12.4	1961	3.1	4.7	4.9
1966	17.1	11.8	10.9	1966	3.2	4.5	4.7
1971	16.1	13.4	11.1	1971	3.7	5.2	6.0
1976	14.4	10.7	9.5	1976	4.3	4.9	6.0

1. Holding the definition of census farm constant at 1976; see Daviault (1978) p.6.
2. Estimates from Appendix A deflated using the CPI (1971=100).
3. Combines net farm income and gross farm asset values annuitized at 10% interest rate over a 30-year period; ratios calculated from estimates appearing as Appendix D of this study.
4. Excludes Newfoundland.

It is interesting to note that in all provinces, both measures of economic well-being changed in the same direction over time and that, except for Saskatchewan, Prince Edward Island and perhaps Alberta, the magnitude of change in the measure which includes annuitized asset values was larger than that for net farm income alone.

ECONOMIC POSITION ON A 'PER FARM' BASIS

Table 2 shows real estimates for farmers' economic well-being on a 'per farm' basis in Canada and the provinces for selected years. These estimates include the net farm income measure and two income-asset value measures using interest rates of 5% and 10% to calculate annuity values. The average farm unit estimates are calculated from aggregate estimates, deflated using the CPI (1971=100), and census farm numbers which reflect a constant 1976 census farm definition.

The 'per farm' real economic well-being estimates rose in all provinces between 1951 and 1976. The estimated levels of economic well-being per farm are typically highest for farms in British Columbia and lowest for those in Quebec. The average farm in British Columbia led all provinces in both net farm income and in economic position over the period, except for the unusually high net farm income in Saskatchewan in 1976. This implies that higher asset values appear correlated with higher net farm incomes. Looking at the ratios of net farm income and economic position between Quebec and British Columbia, it appears that Quebec's real income position relative to that of British Columbia farms actually improved slightly, from 63.9% in 1949 to 65.5% in 1976;

TABLE 2

AVERAGE REAL NET FARM INCOME¹ AND REAL ECONOMIC POSITION²
IN CANADA³, SELECTED YEARS

YEAR	NET FARM INCOME	ECONOMIC POSITION (r=5%)	ECONOMIC POSITION (r=10%)	YEAR	NET FARM INCOME	ECONOMIC POSITION (r=5%)	ECONOMIC POSITION (r=10%)
CANADA				Ontario			
1951	7,268	9,680	11,201	1951	6,684	9,059	10,557
1961	5,974	9,195	11,226	1961	5,687	9,276	11,540
1966	8,298	12,797	15,264	1966	7,950	12,526	15,249
1971	7,080	12,258	15,523	1971	7,640	13,543	17,267
1976	11,037	18,082	22,526	1976	10,832	19,482	24,939
Prince Edward Island				Manitoba			
1951	5,037	6,675	7,708	1951	8,196	10,621	12,151
1961	2,848	4,687	5,848	1961	6,058	9,041	10,923
1966	4,410	6,659	8,077	1966	8,117	12,254	14,863
1971	3,901	6,933	8,845	1971	6,294	10,795	13,634
1976	11,694	15,860	18,488	1976	9,915	15,363	18,800
Nova Scotia				Saskatchewan			
1951	6,858	9,148	10,591	1951	8,391	10,766	12,264
1961	6,585	9,133	10,740	1961	6,523	9,533	11,431
1966	6,399	9,384	11,268	1966	9,196	14,024	17,070
1971	6,559	10,334	12,716	1971	7,263	12,244	15,386
1976	8,464	12,831	15,585	1976	17,768	20,909	25,424
New Brunswick				Alberta			
1951	6,318	8,338	9,613	1951	6,812	9,856	11,776
1961	4,097	6,547	8,092	1961	5,561	9,564	12,090
1966	6,089	8,754	10,434	1966	9,304	14,928	18,476
1971	5,867	9,074	11,096	1971	7,282	13,637	17,645
1976	10,778	15,004	17,670	1976	10,582	17,886	22,493
Quebec				British Columbia			
1951	5,677	7,628	8,859	1951	8,880	12,247	14,371
1961	4,174	6,422	7,840	1961	9,167	14,404	17,708
1966	5,627	8,175	9,781	1966	11,275	18,073	22,361
1971	5,910	8,833	10,676	1971	10,117	19,526	25,461
1976	8,230	12,350	14,948	1976	12,562	24,040	31,279

1. Calculated from aggregate estimates, deflated using the CPI (1971=100) and real census farm numbers (1976 census farm definition).
2. Includes net farm income plus annuitized gross asset values using interest rates of 5% and 10% over a 30-year period; expressed in real terms as above.
3. Excludes Newfoundland.

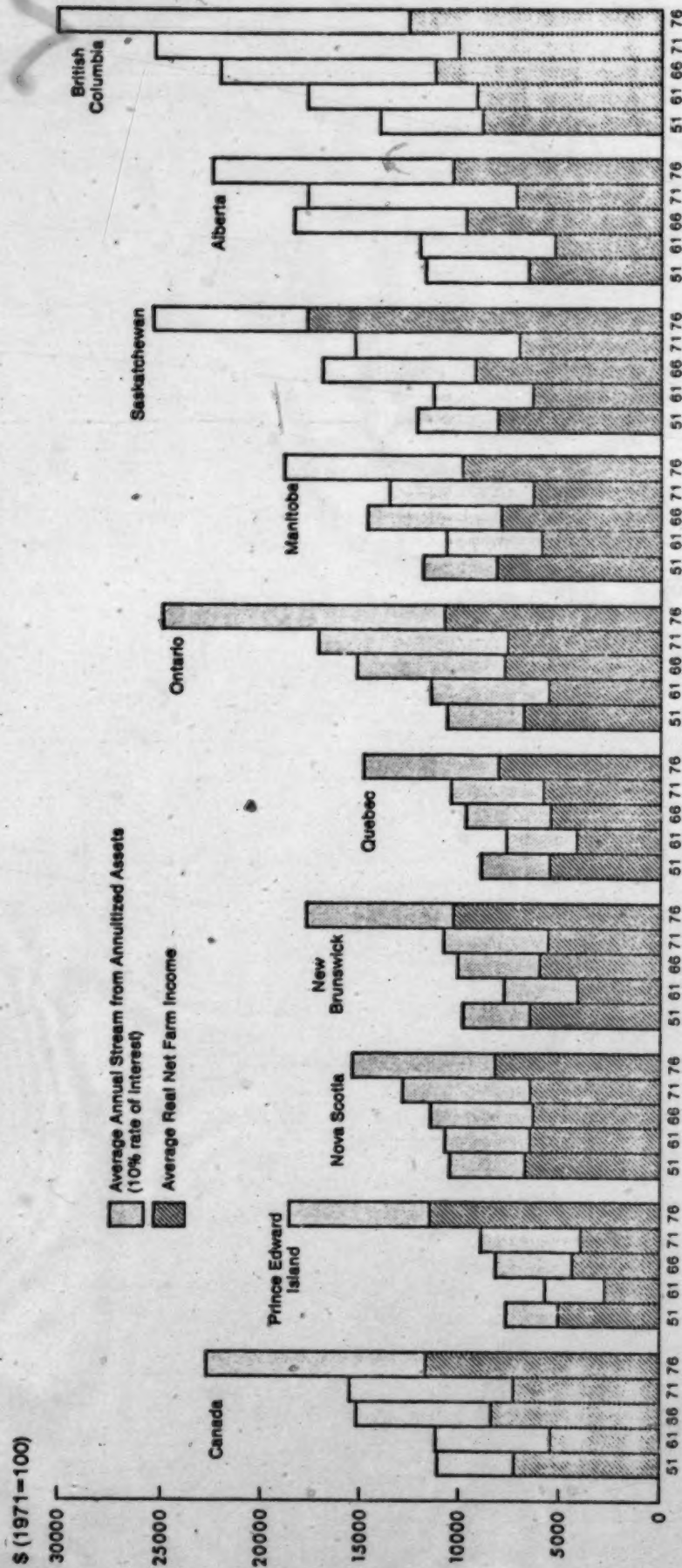
whereas its position vis a vis British Columbia using a composite measure of income and asset values fell from 61.6% to 47.8% in 25 years. Similar comparisons with national averages show Quebec farms' real income position fell modestly from 78.1% to 74.6% compared with the fall in British Columbia farms' real income position from 122.2% to 113.8%. However Quebec farms' real economic position using a measure which includes asset values fell from 79.2% to 66.4%, whereas that of British Columbia farms rose from 128.3% of the national average to 138.9%.

The range across provinces in average real net farm income and average real economic position including annuitized assets widened with time. Between 1951 and 1976, the range of average real net farm income grew by 22.9%, or .9% per year. Over the same period, the range in average real economic position, using a 10% rate of interest to calculate the annuity component, grew by 39.6%, or 1.6% annually.

Figure 15 presents a graphic representation of average real net farm income and average real economic position found in Table 2. The shaded areas show to what extent economic position has been extended by the inclusion to net farm income of asset values annuitized at a 10% rate of interest. Changes in average real net farm income and economic position as calculated here are somewhat more positive than those indicated by aggregate data.

The "average farm" in all provinces increased both its net farm income and its economic well-being which includes asset values between 1951 and 1976. For Nova Scotia and New Brunswick, this situation

Figure 15. Average Real Net Farm Income¹ and Real Economic Position² in Canada³, Selected Years



1. Calculated from aggregate estimates, deflated using the CPI (1971=100) and real census farm numbers (1976 census farm definition).
2. Includes net farm income plus annuitized gross asset values calculated with a 10% rate of interest over a 30-year period. Estimates are deflated using the CPI (1971=100).
3. Excluding Newfoundland.

contrasts with aggregate results which showed real declines in net farm income and economic position in these provinces over the 25 years. In general, real changes in average net farm income show a similar pattern across provinces. Net farm income in 1961 and 1971 is relatively low and in 1976 it is relatively high, though in some provinces the increase is more pronounced than in others. Capital values are important to all provinces but most notably in British Columbia, Ontario and Alberta.

Provincial diversity in real measures of average economic well-being increased over the 25 years between 1951 and 1976. From a situation in 1951 of relative equality throughout Canada in both average net farm income and average economic position which includes annuitized asset values, the "average farm" in Ontario, Saskatchewan and British Columbia moved to a position higher than the national average by 1976. The "average farm" in Ontario and British Columbia fared better than the national average due largely to the asset value component, whereas the contribution of net farm income was more important in Saskatchewan. The economic well-being of the "average farm" in Alberta was lower than the national average using the net farm income measure but was close to or above national average when annuitized asset values were added. The "average farm" in Manitoba started from a position above the national average but by 1966 had slipped below. The "average farm" in Prince Edward Island and New Brunswick received a boost through net farm income in 1976 which was not enjoyed to the same extent by farms in Nova Scotia and Quebec.

SECTORAL COMPARISON OF ECONOMIC POSITIONS

Table 3 provides a comparison of national average measures of farmers' economic well-being with national average non-farm income estimates. The estimates are expressed in real terms using the CPI (1971=100) as the deflator for selected years between 1951 and 1976.

Three categories of real non-farm income are listed. Income of non-farm family units, which includes unattached individuals and families with two or more members, is a composite of wages and salaries, net unincorporated business income, investment income, government transfer payments and miscellaneous income (including pensions and annuities). The other two groups, wages and salaries and net self-employment earnings, are listed separately. Since estimates under this classification have not been published for the 1970s, a proxy of incomes of families living in metropolitan areas has been used.

Since farmers are largely self-employed in a farm occupation, the closest comparison group is likely that of net self-employed earnings in the non-farm sector. This breakdown was not available using the series on families living in metropolitan areas; therefore 1970s estimates for this category are not listed.

Three estimates of real average returns to farm units are given: net farm income and two income-asset value measures where farm asset values have been annuitized using interest rates of 5% and 10%. These estimates have been calculated in this study.

TABLE 3

SECTORAL COMPARISON OF PROVISIONAL ESTIMATES OF AVERAGE REAL
ECONOMIC WELL-BEING MEASURES¹ IN CANADA, SELECTED YEARS

YEAR	NET NON-FARM INCOME ²			NET FARM RETURNS ³		
	Income of All Non-Farm Family Units ⁴	Wages and Salaries ⁵	Net Self- Employment Earnings ⁶	Estimated Net Farm Income	Estimated Economic Position (r=5%)	Estimated Economic Position (r=10%)
1951	4,841	5,180	6,021	7,268	9,680	11,201
1961	6,404	7,030	8,367	5,974	9,195	11,226
1965 1966	7,501	8,313	8,904	8,298	12,797	15,264
1971	11,262	n.a.	n.a.	7,080	12,258	15,523
1976	13,472	n.a.	n.a.	11,037	18,082	22,526

Sources:

-For columns 1, 2 and 3 and years 1951 to 1965: Statistics Canada, Income Distributions, catalogue #13-529 (June 1969) pp.26-29.

-For columns 1, 2 and 3 and years 1971 and 1976: Statistics Canada, Family Incomes (Census Families), catalogue #13-208 (July 1973 and 1978 respectively) p.14.

-Columns 4, 5 and 6 are calculated in this study based on gross farm income, operating expenses and gross farm asset value estimates found in Statistics Canada, Quarterly Bulletin of Agricultural Statistics, catalogue #21-003 (April-June various years). See Appendix D to this study for a representation of these estimates.

1. Using the CPI as deflator (1971=100).
2. Non-farm income for years 1951 to 1965 refers to non-farm income of census families and unattached individuals. This category for years 1971 and 1976 refers to returns to families living in a metropolitan area (defined as a centre with a population of at least 30,000).
NOTE: None of these estimates contain asset value estimates.
3. These estimates do not include off-farm income or quota values, and do not consider asset liability.
4. Estimates for non-farm family units obtained from sample survey and income tax data include family groups and unattached individuals.
5. Wages and salaries estimates for a sub-group of non-farm family units.
6. Net self-employment earnings estimates for a sub-group of non-farm family units.

The estimates are not strictly comparable across categories as important exclusions exist from all groups. Non-farm assets have not been considered; only the last two categories of farm economic position include asset values explicitly in the measure. No off-farm income estimates are included as an income source to farmers; nor are quota values included in the asset component. The farm asset component in the last two columns has not been adjusted for farm liability.

Table 3 indicates that in 1951, real average net farm income was above the income group averages in the non-farm sector. However, by 1961, the net farm income category had fallen below all other estimates for economic well-being. Starting from a higher position, net farm income increased 1.6 times while the other measures of farm economic position which include asset values doubled. It should be noted, however, that because 1951 was a relatively good net farm income year, these increases may understate the actual change in farm economic well-being over time. In the non-farm sector, income of all non-farm family units increased 2.8 times over 25 years.

It appears that different real rates of growth occurred in the various categories listed. Real average non-farm income grew at an average annual rate over 25 years of 7.1%. Real average net farm income increased annually by 2.1%. When annuitized farm asset values are added to net farm income using interest rates of 5% and 10%, annual growth rates for average farm economic position are 3.5% and 4.0% respectively.

CHAPTER 5

SUMMARY AND CONCLUSIONS

Measuring the economic well-being of Canadian farmers has been under consideration in the present study. After arguing that traditional measures do not meet current needs for estimating farmers' economic well-being, the study introduces a measure which considers farm asset values along with net farm income as determinants of economic position. Empirical estimates for the real economic well-being of Canadian farmers between 1949 and 1976 are calculated from net farm income and gross farm asset value estimates published by Statistics Canada. Important weaknesses of these estimates are the omission of off-farm income data and quota value data, and the failure to exclude farm asset liability.

Results of the empirical estimation of real economic positions of farmers in Canada can be summarized into five conclusions.

- 1) Canadian farmers' economic position, measured by net farm income alone or net farm income plus annuitized gross asset values, has improved in real terms since 1949.

- 2) Farmers' economic position in the aggregate and on average in Canada has not increased at the same rate in all provinces.
- 3) There is a growing gap between estimates of net farm income and estimates of farmers' economic position which include annuitized gross farm asset values along with net farm income, with the land component forming a large and increasing proportion of gross farm asset values.
- 4) The distribution of census farms has shifted slightly towards the western provinces over time, as have both the level of net farm income and the size of the capital base on farms.
- 5) On a 'per farm' basis, net farm income and net farm income plus an annuitized asset component have increased substantially but at an historically slower pace than income of various non-farm categories.

The estimates of farmers' economic well-being provided in this study combine net farm income and gross farm asset values to measure economic resources in the hands of the Canadian agricultural sector. These estimates are not intended to represent what farmers can or do consume in any given year. There are risks involved to the farmer in translating productive assets into current purchasing power, since farm income itself depends in part on the use of such assets and historically only ownership guarantees their use.

Credit or tax policies may be used to influence investment in agriculture. Credit policies can encourage or discourage investment, for example, through loan policies which consider the characteristic

variability of farm income and the large capital commitment necessary in agriculture. Tax policies, especially taxation on capital gain, appear to be an increasingly sensitive area for the farm sector.

Further economic data on the farm sector would contribute to the accuracy of measuring Canadian farmers' economic well-being. Deficient areas this study considers to be particularly important include off-farm income and investment estimates, estimates of net investment in agriculture, quota value estimates and income distribution breakdowns.

Given the increasing role of off-farm employment by farmers, off-farm employment income estimates are especially necessary for measures of farmers' economic well-being. The quantity of off-farm investment and resulting non-employment off-farm income would also be an important addition to the present estimates. Data on net investment in agriculture or on asset liability data to combine with published gross investment estimates would improve measurement. Further, data on net investment in agriculture would assist in measurement of capital gains on farm assets. Quota values involve another aspect of farmers' economic well-being which has received little documentation to date. Should these and the more traditional data sources of farm income and farm asset values be available with an income class breakdown, measurement of income distribution within the Canadian farm sector would be possible.

Availability of certain data from the non-farm sector would allow more accurate comparisons between farm and non-farm economic well-being. Asset ownership categories for the non-farm sector would be an important addition to the income component. All non-farm data which uses the category of 'non-farm self-employed' would be of particular interest as a contrast group with farmers.

This study concludes that farm income alone does not provide a realistic estimate of economic well-being of the agricultural sector. As well as redistributing economic resources towards asset owners, capital value appreciation increases capital requirements for growth of the agricultural sector as a whole. Farmers' economic decisions must be made with a view not only to income but also to asset requirements. Capital value appreciation, particularly land price inflation, makes farm asset values a necessary—though not the only necessary—inclusion into a measure for the economic well-being of farmers.

BIBLIOGRAPHY

- ADAMS, Dale W. "Mobilizing Household Savings Through Rural Financial Markets", Development and Change, Vol.9 #1 (Jan. 1978) pp.547-560.
- AMERICAN ECONOMICS ASSOCIATION, The. Readings in Business Cycle Theory, R.D. Irwin (1951).
- ANDAL, M.E. "Land Values—Where Are They Going and Why?" Proc., Farm Management and Agricultural Appraisal Conference, Regina (3-5 July 1978) pp.61-74.
- ANDO, A. and MODIGLIANI, F. "The Life-Cycle Hypothesis of Saving: Aggregate Implications and Tests", AER, Vol.53 (March 1963) pp.55-84.
- BEAL, G.M., BOHLEN, J.M. and WARLAND, R.H. Rural Value-Orientations and Farm-Policy Positions and Actions, Iowa State Univ. Research Bulletin 561 (May 1968).
- BOLLMAN, R.D. "Off-Farm Work by Operators of Canadian Census Farms", CFE, Vol.8 #6 (Dec. 1973) pp.1-5.
- Off-Farm Work by Farmers, Statistics Canada, Ottawa (March 1979).
- BOYNE, D.H. Changes in the Real Wealth Position of Farm Operators 1940-1960, Michigan State Univ., Agricultural Experiment Station Technical Bulletin 294 (1964).
- "Changes in the Income Distribution in Agriculture", JFE, Vol.47 Part 2 (1965) pp.1213-1224.
- BRADSHAW, Gary. "A New Approach to Balance Sheet Analysis", Proc., Farm Management and Agricultural Appraisal Conference, Regina (3-5 July 1978) pp.142-146.
- BRANDOW, G.E. "The Food Price Problem", AJAE, Vol.55 (1973) pp.385-390.
- BREIMYER, H.F. "Heterogeneity in Agriculture: Impediment to Definition of the Farm Problem", JFE, Vol.42 #5 (Dec. 1960) pp.1509-1510.
- , TUCKER, James, CARMAN, H.F., FENWICK, R.S., WOODS, W.F. "How Federal Income Tax Rules Affect Ownership and Control of Farming", American Society of Farm Managers and Rural Appraisers Journal, Vol.39 #2 (Oct. 1975) pp.61-67.
- BRINKMAN, George L. and GELLNER, J.A. "Relative Rates of Resource Returns for Ontario Commercial Farms—A Farm to Nonfarm Comparison, 1971-1974", CJAE, Vol.25 #2 (July 1977) pp.26-44.

- BRUNST, A.S. "Farm Debt in Canada", CFE, Vol.13 #1 (Feb. 1978) pp.1-7.
- BRYANT, W.K. "The Changing Effects of Nonfarm Business Expansions on Farm Costs", JFE, Vol.44 Part 1 (1962) pp.1077-1084.
- BUDD, E.C. and SEIDERS, D.F. "The Impact of Inflation on the Distribution of Income and Wealth", AER, Papers & Proc., Vol.61 (1971) pp.128-138.
- BUSE, R.C. and BROMLEY, D.W. Applied Economics, Iowa State Univ. Press (1975).
- BUTLIN, J.A. "The Effect of Canadian Business Cycles on the Adoption of Technological Innovations in Canadian Agriculture 1926/67", CJAE, Vol.19 #2 (October 1971) pp.61-71.
- CANADA DEPARTMENT OF AGRICULTURE, A Task Force Report. Orientation of Canadian Agriculture, 4 Volumes, Ottawa (1977).
- CARLIN, Thomas A. "Economic Position of Farm Families When Money Income and Net Worth Are Combined", Agricultural Economics Research, Vol.25 #3, United States Dept. of Agriculture, Economic Research Service (July 1973) pp.61-70.
- and REINSEL, E.I. "Combining Income and Wealth: An Analysis of Farm Family 'Well-Being'", AJAE, Vol.55 (Feb. 1973) pp.38-44.
- CARPENTER, S. Alvin. Inflation—To Control or Accept, Univ. of California Agriculture Extension Service (Nov. 1969).
- CHRYST, Walter E. "Land Values and Agricultural Income: A Paradox?" JFE, Vol.47, Part 2 (1967) pp.1265-1272.
- CLARK, Colin. "The Value of Agricultural Land", JAE, Vol.20 #1, England (January 1969) pp.1-18.
- DARCOVICH, W., DAVEY, B., GELLNER, J., PIRACHA, Z. Income Profiles of Farm Taxfilers, Agriculture Canada, Publication #75/14, Ottawa (July 1975).
- , NEUMEYER, K., STEVENSON, R. Income and Financial Data of Farm Taxfilers, 1973, Agriculture Canada, Publication #75/22 (Nov. 1975).
- , GELLNER, J., LEUNG, D. Income of Farm Family Units 1975, Agriculture Canada (May 1979).
- and MOUELHI, M. Farm and Off-Farm Incomes of Farm Families, 1973, Agriculture Canada, Publication #76/6 (June 1976).
- DAVEY, B.H. and HASSAN, Z.A. "Farm and Off-Farm Incomes of Farm Families in Canada", CFE, Vol.9 #6 (Dec. 1974) pp.16-23.
- DAVIAULT, R. Selected Agricultural Statistics for Canada, Agriculture Canada, Publication #77/10 (June 1977) and #78/10 (Nov. 1978), Ottawa.

DOMINION BUREAU OF STATISTICS. The Consumer Price Index for Canada (1949=100), #62-518, Ottawa (March 1961).

— Handbook of Agricultural Statistics Part II Farm Income 1926-1965, #21-511, Ottawa (June 1967).

DRUMMOND, W.M., ANDERSON, W.J. and KERR, T.C. A Review of Agricultural Policy in Canada, Agricultural Economics Research Council of Canada, Publication #1 (June 1966).

ECKSTEIN, A. and HEIEN, Dale. "The 1973 Food Price Inflation", AJAE, Vol.60 #2 (May 1978) pp.186-196.

EVANS, A.F. "The Impact of Taxation on Agriculture", JAE, Vol.20 #2, England (May 1969) pp.217-225.

FEDERAL TASK FORCE ON AGRICULTURE. Canadian Agriculture in the 1970s, Ottawa (Dec. 1969).

FOOD PRICES REVIEW BOARD. Prices, Incomes and Capital Formation in Canadian Agriculture, Ottawa (March 1975).

FRISCH, Helmut. "Inflation Theory 1963-1976: A 'Second Generation' Survey", J. Econ. Lit., Vol.15 #4 (Dec. 1977) pp.1289-1317.

FRIEDMAN, M. "What Price Guideposts", in SCHULTZ, G.P. and ALIBER, R.Z. (eds.), Guidelines, Informal Controls and the Market Place, Chicago Univ. Press (1966).

FITZPATRICK, J.M. 1958 Farm Survey Report #2 Farm and Farm Family Income, Farm Expenditures and Resources in Canadian Agriculture, Dominion Bureau of Statistics, #21-509, Ottawa (May 1967).

FURNISS, I.F. "Productivity Trends in Canadian Agriculture 1935 to 1964", CFE, Vol.1 #1 (April 1966) pp.18-22.

GARDNER, B.D. and POPE, R.D. "How Is Scale and Structure Determined in Agriculture?" AJAE, Vol.60 #2 (May 1978) pp.295-302.

GELLNER, J.A. and BIRKS, G.J. Farm and Off-Farm Incomes of Farm Taxfilers 1974, Agriculture Canada, Publication #77/9 (July 1977).

GORDON, J.R., NELSON, Glenn L. and UHL, J.N. "The Distributional Impacts of Inflation on Farmers vs. Nonfarmers 1960-74, Am.Soc. of Farm Managers and Rural Appraisers Journal, Vol.40 #2 (Oct. 1976) pp.21-27.

GROVE, E.W. "Farm Capital Gains—A Supplement to Farm Income?" Agricultural Economics Research, Vol.12 #2 (April 1960) pp.37-42.

— "Econometricians and the Data Gap: Comment", AJAE, Vol.51 Part 1 (1969) pp.184-188.

HARRIS, Duane G. and NEHRING, R.F. "Impact of Farm Size on the Bidding Potential for Agricultural Land", AJAE, Vol.58 #2 (May 1976) pp.161-169.

HATHAWAY, D.E. "Agriculture in an Unstable Economy Revisited", JFE, Vol.41 #3 (August 1959) pp.487-499.

— "Agriculture and the Business Cycle", JFE, Part 1 (1959) pp.487-499.

HAYAMI, Y. and RUITAN, V.W. Agricultural Development: An International Perspective, The John Hopkins Press (1971).

HOOVER, Dale M. "The Measurement and Importance of Real Capital Gains in U.S. Agriculture, 1940 through 1959", JFE, Vol.44 #4 (Nov. 1962) pp.929-940.

HOOVER, Donald L. "The Rural Capitalization Rate Under the Income Approach", American Society of Farm Managers & Rural Appraisers Journal, Vol.40 #1 (April 1976) pp.24-30.

HUFF, H.B. and CUSACK, T.J. Capital Gains in Canadian Agriculture 1946-66, Univ. of Guelph Publication AE/72/1.

— and MacAULAY, T.G. "Summing Components of Real Capital Gains", AJAE, Vol.55 (1973) pp.69-72.

JOHNSON, Bruce B. "Estimating Rates of Return on Farmland Investments", American Society of Farm Managers & Rural Appraisers Journal, Vol.38 (Oct. 1974) pp.41-48.

JOHNSON, D. Gale. "Government and Agriculture: Is Agriculture a Special Case?" in H.C. Harlan (ed.), Readings in Economics and Politics, Oxford Univ. Press, New York (1961) pp.28-46.

JOHNSON, Glenn L. "Supply Functions--Some Facts and Notions", in E.O. Heady, et. al. (ed.), Agricultural Adjustment Problems in A Growing Economy, Iowa State College Press (1956) pp.74-93.

JOHNSTON, B.F. and KILBY, Peter. Agriculture and Structural Transformation, Oxford Univ. Press (1975).

JONES, W.D. and TUNG, F.L. "A Regional Comparison of Structural Change and Resource Use in the Canadian Farm Industry, 1961 to 1971", CFE, Vol.12 #5 (October 1977).

KESSEL, Reuben A. "Inflation-Caused Wealth Redistribution: A Test of a Hypothesis", AER, Vol.46 (1956) pp.128-141.

KING, E.E.R. "Decreasing Farm Numbers and Incomes", CFE, Vol.1 #1 (April 1966) pp.27-29.

KULSHRESHTHA, S.N. "An Approach to Develop Comparisons of Farm and Nonfarm Incomes in Canada", CJAE, Vol.14 (1966) pp.61-76.

- LEE, W.F. and RASK, Norman. "Inflation and Crop Profitability: How Much Can Farmers Pay for Land?" AJAE, Vol.58 #5 (Dec, 1976) pp.984-990.
- LEKACHMAN, R. Inflation: The Permanent Problem of Boom and Bust, Random House, New York (1973).
- LEROHL, M.L. Assets, Liabilities and Net Worth of Canadian Farm Operators, 1935-1960, Agr. Econ. Research Council of Canada Publication #10 (March 1967).
- "Farm Capital and Farm Taxation", address to the 30th National Appraisal Inst. Conf. June 1967), in Economic Papers, AERCC (1967) pp.21-36.
- and MacEACHERN, G.A. "Factor Shares in Agriculture: The Canada United States Experience", CJAE, Vol.15 #1 (1967) pp.1-20.
- LOVE, Roger. Income Distribution and Inequality in Canada, Statistics Canada, Ottawa, #99-755E (March 1979).
- LOYNS, R.M.A. and WARRACK, A.A. "Rising Prices, Shrinking Dollars—Inflation and the Consumer", Dept. of Rural Economy, Univ. of Alberta, mimeo (1971).
- LOYNS, R.M.A. CPI and IPI As Measures of Recent Price Changes, Prices and Incomes Commission, Ottawa (1972).
- LYDALL, H. and LANSING, J.B. "A Comparison of the Distribution of Personal Income and Wealth in the United States and Great Britain", AER, Vol.49 (1959) pp.43-67.
- MacMILLAN, J.A. and LOYNS, R.M.A. "A Cross-Section Analysis of Farm Household Expenditures", CJAE, Vol.17 #2 (July 1969) pp.92-105.
- MacMILLAN, J.A., TUNG, Fu-Lai and LOYNS, R.M.A. "Differences in Regional Household Consumption Patterns by Urbanization: A Cross-Section Analysis", J. Regional Science, Vol.12 #3 (1972) pp.417-424.
- MADDEN, J. Patrick. "Income, Wealth and Opportunities of the Farm Population" in Iowa State Univ. Centre for Agricultural and Economic Development, Benefits and Burdens of Rural Development, Iowa State Univ. Press (1970).
- MANNING, T.W. The Canadian Farm Income Problem, Dept. of Extension, Univ. of Alberta (June 1963).
- McCLATCHY, D. and CAMPBELL, C. "An Approach to Identifying the Locating the Low Income Farmer", CFE, Vol.10 #2 (April 1975) pp.1-11.

- MELLOR, J.W. "Toward A Theory of Agricultural Development" in H.M. Southworth and B.F. Johnston (eds.), Agricultural Development and Economic Growth, Cornell Univ. Press (1967).
- MOFFAT, D.W. Economics Dictionary, Elsevier Scientific Pub. Co. (1976).
- PASOUR, E.C. Jr. "Real Property Taxes and Farm Real Estate Values: Incidence and Implications", AJAE, Vol.55 (1973) pp.549-556.
- PERKINS, Brian B. "Farm Income and Labour Mobility", AJAE, Vol.55 #5 (Dec. 1973) pp.913-920.
- PETERSON, W. and HAYAMI, Y. "Technical Change in Agriculture" in A Survey of Agricultural Economics Literature, Vol.1, Am. Agr. Econ. Society, (1977) pp.497-540.
- QUANCE, Leroy and TAYLOR, G.C. "Anticipating the Future" in Looking Forward: Research Issues Facing Agriculture and Rural America, U.S. Dept. of Agr., Econ. Research Service (Sept. 1977) pp.7-25.
- QUANCE, Leroy and TWEETEN, L. "Simulating the Impact of Input-Price Inflation on Farm Income", Southern J. of Ag. Econ. (Dec. 1971) pp.51-57.
- RAUP, Philip M. "Land Reform and Agricultural Development" in H.M. Southworth and B.F. Johnston (eds.), Agricultural Development and Economic Growth, Cornell Univ. Press, N.Y. (1967) pp.267-315.
- "Some Questions of Value and Scale in American Agriculture", AJAE, Vol.60 #2 (May 1978) pp.303-308.
- ROWAN, D.C. Output Inflation and Growth, Macmillan (1968).
- RUST, R.S. "Farm Credit", CFE, Vol.1 #1 (April 1966); Vol.2 #2 (June 1967); Vol.9 #5 (Oct. 1974); Vol.10 #1 (Feb. 1975); and Vol.11 #6 (Dec. 1976).
- RUTTAN, V. Induced Technical and Institutional Change and the Future of Agriculture, ADC (Dec. 1973).
- SCHUH, G.E. "The New Macroeconomics of Agriculture", AJAE, Vol. 58 #5 (Dec. 1976) pp.802-811.
- SCHULTZ, T.W. Agriculture in An Unstable Economy, McGraw Hill, N.Y. (1945).
- Production and Welfare of Agriculture, Macmillan (1949).
- "A Report on Workshop Discussion" in G.P. Schultz and R.Z. Aliber (eds.), Guidelines, Informal Controls and the Market Place, Univ. of Chicago Press (1966) pp.274-276.
- Economic Growth and Agriculture, McGraw Hill (1968).

- SCHUMPETER, J.A. The Theory of Economic Development, Oxford Univ. Press, N.Y. (1971); first printed: Harvard (1934).
- SCOFIELD, W.H. "Land Prices and Farm Income Relationships", Agricultural Finance Review, U.S. Dept. of Agriculture, Econ. Research Service, Vol.25 (Aug. 1964).
- SCOTT, J.F. "Problems, Policies and Data Needs in Canadian Agriculture", CJAE, Vol.19 #3 (Nov. 1971) pp.93-107.
- SHAFFNER, Richard. The Quest For Farm Income Stability in Canada, Howe Research Inst. (March 1977).
- SHAW, Paul. Canada's Farm Population, Statistics Canada #99-750E (March 1979).
- STATISTICS CANADA. Census of Canada, Vols. 11-13 (1976).
- Consumer Price Index, #62-010 (monthly).
- Farm Input Price Indexes, #62-534 (Dec. 1971).
- National Income and Expenditure Accounts, Vol.1, The Annual Estimates 1926-1974, #13-531 (March 1976).
- Prices and Price Indexes, #62-002 (monthly).
- Quarterly Bulletin of Agricultural Statistics, #21-003 (April-June various years).
- STUART, A. paper presented at a conference on Organization and Direction of our Food System in the 1980s, Edmonton (June 1979).
- THOMPSON, D. Investment Demand for Farm Credit in Canada, unpublished M.Sc. thesis, Dept. of Rural Economy, Univ. of Alberta (1978).
- TUBBS, Alan R. Agriculture in the Current Economic Environment, Oklahoma Agricultural Exp. Stn., Ag.Ec. paper #7117 (Nov. 1971).
- TUNG, F.L. and JONES, W.D. "Forecasting Farm Credit Requirements for 1981", CFE, Vol.14 #3 (June 1979) pp.1-8.
- TWEETEN, L. "Theories Explaining the Persistence of Low Resource Returns In A Growing Farm Economy", AJAE, Vol.51, Part 1 (1969) pp.798-817.
- and GRIFFIN, S. General Inflation and the Farming Economy, Agral. Exp. Stn., Oklahoma State Univ., Research Rpt. P-732 (March 1976).
- and MARTIN, J.E. "Methodology for Predicting U.S. Farm Real Estate Price Operations", JFE, Vol.48 #2 (May 1966) pp.378-393.

TWEETEN, L. and NELSON, T.R. Sources and Repercussions of Changing U.S. Farm Real Estate Values, Oklahoma Agral. Exp. Stn., Technical Bulletin T-120 (1966).

— and QUANCE, L. "The Impact of Input Price Inflation on the U.S. Farming Industry", CJAE, Vol.19 #3 (Nov. 1971) pp.35-49.

— and _____. "The Impact on Net Farm Income of National Inflation", Agral. Exp. Stn., Oklahoma State Univ., mimeo.

— and SCHREINER, D. "Economic Impact of Public Policy and Technology on Marginal Farms and on the Nonfarm Rural Population", in Iowa State Univ. Centre for Agral. and Ec. Development, Benefits and Burdens of Rural Development, Iowa State Univ. Press (1970).

VEEMAN, M.M. and VEEMAN, T.S. "The Directions of Canadian Agricultural Policy", CJAE Proc. Issue (1976) pp.78-90.

— and _____. "The Changing Organization, Structure and Control of Canadian Agriculture", AJAE, Proc. Issue, Vol.60 #5 (Dec. 1978) pp.759-768.

WALLACE, T.D. and HOOVER, D.M. "Income Effects of Innovation: The Case of Labour in Agriculture", JFE, Vol.48 #2 (May 1966) pp.325-336.

WARLEY, T.K. Agriculture in an Interdependent World: U.S. and Canadian Perspectives, Canadian-American Committee, Howe Research Inst. (May 1977).

WEISBROD, B.A. and HANSEN, W.L. "An Income-Net Worth Approach to Measuring Economic Welfare", AER, Vol.58 (Dec. 1968) pp.1315-1329.

WILMAN, M. "Changes in Farm Size and Numbers in Canada to 1966", CFE, Vol.2 #4 (Oct. 1967) pp.21-28.

WIRICK, R.G. A Preliminary Paper on Some Food Policy Aspects of Farm Income, commissioned by the Food Prices Review Board, Reference Paper #9, Ottawa (1975).

APPENDIX A-1: GROSS FARM INCOME, OPERATING EXPENSES AND ASSET VALUES
CURRENT DOLLAR ESTIMATES (\$000'S) 1949-1976 CANADA

YEAR	GROSS FARM INCOME	OPERATING EXPENSES	NET FARM INCOME	FARM LANDS & BUILDINGS	IMPLEMENTS & MACHINERY	LIVESTOCK & POULTRY	TOTAL ASSETS
1949	2713554	1041221	1672333	4716823	1415546	1370792	7503161
1950	2433595	1096460	1337135	5022642	1681075	1467580	8171297
1951	3070138	1219445	1850693	5512519	1931880	2006491	9450890
1952	3140581	1276951	1863630	5668467	2076787	1790874	9536128
1953	3040061	1261234	1778827	6295977	2257636	1556503	10110116
1954	2615208	1250642	1364566	6183050	2352548	1424076	9959674
1955	2593716	1313381	1280337	6567066	2283627	1462727	10313420
1956	2860041	1425766	1434275	6852657	2263286	1422719	10538662
1957	2848316	1407262	1441054	6958491	2371409	1512472	10842372
1958	3159537	1504281	1655656	7440775	2441191	1860461	11742427
1959	3122418	1600681	1521737	7842190	2509654	1956443	12308287
1960	3162327	1665675	1496652	8226925	2575025	1878010	12679960
1961	3278798	1692224	1586574	8603397	2565538	1990234	13159169
1962	3532290	1823269	1709021	8974027	2656211	2053779	13684017
1963	3588792	1954107	1634685	9571797	2810539	2126188	14508524
1964	3893096	2032175	1860921	10536963	3015562	2191530	15744055
1965	4236534	2151836	2085098	11816736	3263250	2137861	17217847
1966	4737255	2451313	2285942	13149821	3548848	2364002	19062671
1967	4846864	2619126	2227738	14591090	3830091	2531439	20952620
1968	4856072	2692717	2163355	15852116	4089657	2501285	22443060
1969	4717450	2751711	1965739	16068232	4285476	2965165	23318873
1970	4780732	2817322	1963410	16738363	3922579	3139658	23801000
1971	5101807	2978781	2123026	16911982	3404900	3069499	23886381
1972	6012892	3204619	2808273	17386692	4072599	3718556	25177847
1973	7550339	4019834	3530505	20291321	4348288	4882555	29522164
1974	9753604	4835458	4918146	25952497	5169100	4959635	36083232
1975	10553554	5563220	5350334	32125435	6330457	4029643	42485535
1976	11004175	6035613	4568562	37204762	7308479	4280226	48793467

Source: Statistics Canada, Quarterly Bulletin of Agricultural Statistics, Catalogue # 21-003, Ottawa (April-June various years) (exclude Newfoundland)

APPENDIX A-2: GROSS FARM INCOME, OPERATING EXPENSES AND ASSET VALUES
CURRENT DOLLAR ESTIMATES (\$000'S) 1945-1976 P.E.I.

YEAR	GROSS FARM INCOME	OPERATING EXPENSES	NET FARM INCOME	FARM LANDS & BUILDINGS	IMPLEMENTS & MACHINERY	LIVESTOCK & POULTRY	TOTAL ASSETS
1949	24831	11729	13102	42821	13130	15708	71659
1950	25573	11866	13707	44550	14653	16660	75863
1951	25694	12267	17427	47844	16261	23093	87198
1952	36824	14482	22342	48519	17841	19287	85647
1953	26930	14253	12677	48519	20123	16343	84985
1954	27669	14192	13477	47168	21400	15540	84108
1955	28893	15416	13477	47168	21215	15614	83997
1956	29886	15448	14438	48519	22022	14638	85179
1957	28341	15246	13095	48519	24010	14377	86906
1958	31988	16233	15755	50508	25115	16149	91772
1959	32288	16985	15303	52501	26108	17185	95794
1960	32862	18045	14817	52501	26774	16754	96029
1961	28143	18450	9693	52501	26856	16957	96314
1962	28869	18110	10759	54852	28099	16969	99920
1963	25954	19127	10827	57546	29783	17557	104886
1964	36383	20179	16204	60065	30962	18084	109115
1965	45608	22127	23481	62592	32990	19014	114596
1966	42614	26209	16405	72683	35655	20354	128692
1967	35332	27069	12263	78813	38699	21683	139195
1968	40153	28238	11915	84943	41635	20208	146786
1969	43676	29243	14433	89190	44485	23729	157404
1970	51082	30205	20877	101207	38592	23226	163025
1971	44267	30759	13508	102090	38273	21089	161452
1972	50388	32603	17785	112295	39944	24232	176475
1973	80014	39548	40466	132737	42090	29969	204796
1974	92951	50448	42503	171496	48985	32276	252757
1975	51614	56021	35593	187788	59021	31437	278246
1976	113294	59726	53568	194924	67121	31586	293631

Source:

Statistics Canada, Quarterly Bulletin of Agricultural Statistics,
Catalogue # 21-003, Ottawa (April-June various years) (exclude Newfoundland)

APPENDIX A-3:

GROSS FARM INCOME, OPERATING EXPENSES AND ASSET VALUES
CURRENT DOLLAR ESTIMATES (\$000'S) 1949-1976 N.S.

YEAR	GROSS FARM INCOME	OPERATING EXPENSES	NET FARM INCOME	FARM LANDS & BUILDINGS	IMPLEMENTS & MACHINERY	LIVESTOCK & POULTRY	TOTAL ASSETS
1949	43545	21362	22183	86649	20873	24338	131860
1950	45712	20553	25159	90551	23005	28278	141834
1951	53174	23444	29730	94486	25224	32955	152665
1952	53974	24100	29874	94250	27140	33849	155239
1953	52702	23656	29046	94250	29575	28425	152250
1954	54033	24330	29703	94250	30939	25252	150441
1955	51634	24676	26958	94198	30020	25958	150176
1956	54006	26591	27415	93321	30692	23831	147844
1957	53183	25425	27758	93321	32369	22342	148032
1958	52795	26705	26090	93788	32138	23582	147589
1959	53414	29745	23669	91930	32115	26703	148943
1960	52582	29496	23086	90125	31521	26318	147964
1961	54525	29568	24557	89263	30252	26642	146157
1962	54968	30995	23973	86817	31852	26982	145651
1963	55694	32563	23131	86790	31606	26873	145269
1964	54835	33961	20874	90495	32079	26586	149164
1965	59487	35349	24138	94208	32994	26305	153507
1966	62269	39315	22954	102849	34444	27511	164804
1967	62070	39470	22600	107746	36992	29141	173879
1968	62732	39372	23360	113668	39871	30287	184026
1969	71233	41090	30143	122977	42341	33186	198504
1970	74093	47498	26595	131518	39443	33454	204415
1971	72352	49213	23179	132233	39868	33162	205263
1972	60488	52339	28149	138580	40946	35595	215121
1973	104789	65622	39167	158674	43382	44609	246665
1974	112492	80190	32302	202785	49943	50735	303463
1975	125407	87894	37513	219211	60202	47381	326794
1976	133127	89440	43687	227979	68506	50258	346743

Source:

Statistics Canada, Quarterly Bulletin of Agricultural Statistics,
Catalogue # 21-003, Ottawa (April-June various years) (exclude Newfoundland)

APPENDIX A-4: GROSS FARM INCOME, OPERATING EXPENSES AND ASSET VALUES
CURRENT DOLLAR ESTIMATES (\$000'S) 1945-1976 N.B.

YEAR	GROSS FARM INCOME	OPERATING EXPENSES	NET FARM INCOME	FARM LANDS & BUILDINGS	IMPLEMENTS & MACHINERY	LIVESTOCK & POULTRY	TOTAL ASSETS
1949	52520	21973	30547	87466	22089	25522	135077
1950	53375	21970	31405	97551	24475	26509	148894
1951	56876	24794	32082	98717	26971	32120	157808
1952	63510	26338	37172	98500	28959	29392	156851
1953	49876	25795	24081	97504	31448	26785	155737
1954	52009	25550	26459	97500	32664	23106	153270
1955	48413	26220	22193	97504	31669	23814	152987
1956	54557	27944	26613	96257	32099	23230	151586
1957	51398	26814	24584	95646	33732	22342	151165
1958	52376	28241	24135	93788	33926	24834	152548
1959	50673	29745	20928	91930	33943	25001	150874
1960	53985	31297	22688	91500	33321	23675	148496
1961	47586	31780	15806	90115	31682	23617	145414
1962	48595	30995	18004	86019	32860	22551	141430
1963	48715	32657	16058	89443	33180	22496	145119
1964	55365	34184	21181	89947	33966	22169	146082
1965	67961	35604	32357	90451	35164	21823	147438
1966	60834	38412	22422	91628	36825	22518	150971
1967	54819	37737	17082	95293	40001	23142	158436
1968	55775	38905	16870	105067	43093	24226	172386
1969	58276	40045	18231	112422	45227	25787	183436
1970	63585	36146	27439	111392	40799	24948	177139
1971	57939	37486	20453	106607	40600	24769	171976
1972	70367	39816	30551	114176	42881	27698	184755
1973	102302	48694	53608	130503	45528	33967	209998
1974	110432	60397	50035	163129	53068	37840	254037
1975	107692	67013	40679	203422	63765	33719	300910
1976	121764	69316	52448	208914	72305	35135	316354

Source: Statistics Canada, Quarterly Bulletin of Agricultural Statistics, Catalogue # 21-003, Ottawa (April-June various years) (exclude Newfoundland)

APPENDIX A-5:

GROSS FARM INCOME, OPERATING EXPENSES AND ASSET VALUES
CURRENT DOLLAR ESTIMATES (\$000'S) 1949-1976 QUEBEC

YEAR	GROSS FARM INCOME	OPERATING EXPENSES	NET FARM INCOME	FARM LANDS & BUILDINGS	IMPLEMENTS & MACHINERY	LIVESTOCK & POULTRY	TOTAL ASSETS
1949	370201	156044	214157	670357	169413	263291	1103061
1950	385223	163686	221537	752753	189607	269538	1211898
1951	450508	186508	264400	846973	211937	338946	1397856
1952	457986	196967	261019	860893	228588	328942	1418423
1953	423523	190487	233036	868105	245283	284581	1357969
1954	423590	205171	218419	896113	251303	258127	1405543
1955	431755	214789	216966	902821	247411	250520	1400752
1956	437224	236281	200943	930828	254403	257156	1442387
1957	445132	232751	216381	930828	272099	256423	1459350
1958	487974	260218	227756	952127	287524	303753	1543404
1959	483590	274975	208611	972755	300076	314288	1587119
1960	476373	281687	194686	994054	306381	310684	1611119
1961	485960	293708	196272	1014682	301257	309871	1625810
1962	514066	309371	204695	1004328	322167	327668	1654163
1963	527214	328990	198224	1028394	338060	333701	1700155
1964	533322	338096	195226	1055963	352346	320981	1729290
1965	593289	365413	227876	1104028	361901	322120	1788049
1966	684306	413459	270847	1159021	373980	353474	1886475
1967	652471	446966	245505	1197579	404439	394025	1996443
1968	707733	445954	261779	1285640	440393	409383	2135416
1969	745753	462025	283768	1349922	484522	456213	2290657
1970	729000	452587	276413	1388449	427524	451506	2267479
1971	761683	476759	284884	1321792	427538	418561	2167891
1972	860169	513669	346500	1443357	454320	499098	2396815
1973	1076560	658941	418019	1639699	490024	649734	2779457
1974	1272947	810348	462599	1892213	576977	737091	3206281
1975	1470960	890457	580503	2200644	701954	660002	3562600
1976	1470315	938267	532048	2686986	799921	610251	4097158

Source:

Statistics Canada, Quarterly Bulletin of Agricultural Statistics,
Catalogue # 21-003, Ottawa (April-June various years) (exclude Newfoundland).

APPENDIX A-6:

GROSS FARM INCOME, OPERATING EXPENSES AND ASSET VALUES
CURRENT DOLLAR ESTIMATES (\$000'S) 1949-1976 CNIA/EO

YEAR	GROSS FARM INCOME	OPERATING EXPENSES	NET FARM INCOME	FARM LANDS & BUILDINGS	IMPLEMENTS & MACHINERY	LIVESTOCK & POULTRY	TOTAL ASSETS
1949	733345	341064	392281	1142096	335565	449679	1927344
1950	731789	362443	369346	1194178	389352	485067	2068597
1951	876700	410781	465919	1419364	445278	682197	2546839
1952	830915	420834	410081	1464329	486588	561148	2511747
1953	807925	423887	384038	1600376	519570	490068	2610014
1954	786281	438509	347772	1667247	531526	454733	2653506
1955	817102	452381	364721	1803294	520991	459295	2783580
1956	811582	503365	311217	1893223	526358	430056	2849637
1957	855452	493922	361530	1984305	556333	465308	3005946
1958	939342	527168	412174	2165316	574683	575884	3315883
1959	950523	566072	384451	2391292	589969	593555	3574816
1960	558440	578295	380145	2369386	596787	578124	3544297
1961	984801	599088	385713	2572303	579282	593722	3745307
1962	1035645	621542	418107	2681763	598213	630884	3910860
1963	1118102	667388	450714	2719070	633141	614886	3967097
1964	1147717	706974	440743	2930871	667583	619394	4217848
1965	1233360	739162	454198	3125974	710403	616873	4453250
1966	1356507	832188	564319	3451146	758398	678372	4887916
1967	1436940	910110	526830	3964392	817155	735287	5516834
1968	1490112	917348	572764	4566130	873212	749701	6189043
1969	1574078	945323	628755	5296711	924187	850116	7071014
1970	1550670	994092	596578	5005110	877785	857083	6739978
1971	1612046	1034124	577922	5183419	890037	796508	6869964
1972	1817290	1100279	717011	5411489	939321	957135	7307945
1973	2228638	1368876	859762	6565548	1012490	1242151	8824189
1974	2785457	1615542	1173915	8540412	1191652	1211228	10543292
1975	3001828	1795187	1206641	10778000	1440567	1080939	13299506
1976	3161255	1910490	1250765	12567148	1632210	1168565	15367923

Source:

Statistics Canada, Quarterly Bulletin of Agricultural Statistics,
Catalogue # 21-003, Ottawa (April-June various years) (exclude Newfoundland)

APPENDIX A-7: GROSS FARM INCOME, OPERATING EXPENSES AND ASSET VALUES
CURRENT DECLARABLE ESTIMATES (\$000'S) 1949-1976 MANITOBA

YEAR	GROSS FARM INCOME	OPERATING EXPENSES	NET FARM INCOME	FARM LANDS & BUILDINGS	IMPLEMENTS & MACHINERY	LIVESTOCK & POULTRY	TOTAL ASSETS
1945	271839	92415	179424	463002	157043	113761	733806
1950	223813	93969	129844	495903	201041	115349	812293
1951	299500	98043	201457	528873	231801	156612	917286
1952	271052	100097	170955	544895	248006	138326	931227
1953	246125	98684	147441	625000	267411	120111	1012522
1954	213215	94086	119133	576177	274057	105563	955797
1955	202677	96577	106100	592199	261103	113063	966365
1956	235736	103799	131937	624243	251983	109831	986057
1957	223392	102692	120700	608221	259489	111543	979253
1958	257555	107732	149823	640265	261516	144353	1046134
1959	255887	114067	141820	624243	264691	157742	1046676
1960	258577	121300	137277	687568	271253	150536	1109357
1961	269770	117292	152478	719612	272019	163723	1155354
1962	287795	136579	151216	732938	280239	166889	1180066
1963	297437	142743	154694	801695	297545	179864	1279104
1964	328610	152683	175927	916337	322136	191836	1430309
1965	370808	160231	210577	1063537	350070	181647	1595254
1966	412040	187674	224366	1178178	380352	200888	1759418
1967	409482	209015	200467	1307490	418358	207649	1933497
1968	402902	220968	181934	1393698	451538	196831	2042067
1969	387730	211149	176581	1256135	470386	245272	2011797
1970	384887	211445	173442	1390455	420500	276363	2087318
1971	414256	228035	186221	1374235	411471	262687	2048397
1972	529270	249078	280192	1374239	419010	316567	2109816
1973	669471	310436	359035	1573504	442861	419649	2436014
1974	882584	402158	480826	2004644	530216	425208	2960068
1975	596406	475638	520768	2285294	656227	330231	3271752
1976	566478	520855	445623	2666938	764092	335937	3766967

Source:

Statistics Canada, Quarterly Bulletin of Agricultural Statistics,
Catalogue # 21-003, Ottawa (April-June various years) (exclude Newfoundland)

APPENDIX A-8: GROSS FARM INCOME, OPERATING EXPENSES AND ASSET VALUES
CURRENT DOLLAR ESTIMATES (\$000'S) 1949-1976 SASK.

YEAR	GROSS FARM INCOME	OPERATING EXPENSES	NET FARM INCOME	FARM LANDS & BUILDINGS	IMPLEMENTS & MACHINERY	LIVESTOCK & POULTRY	TOTAL ASSETS
1949	627160	196774	430386	1044854	372463	195279	1612596
1950	466214	207047	259167	1113658	449591	209659	1772908
1951	682361	224735	457626	1182905	525645	283891	1992441
1952	754771	246369	508402	1258350	558823	264908	2082081
1953	781473	236431	545042	1331774	617581	224037	2173392
1954	511315	208365	302950	1258350	659286	198914	2116550
1955	486026	229040	256986	1407220	635283	214068	2256571
1956	634182	243525	350653	1482665	615217	216437	2314319
1957	575108	236701	338407	1482665	636509	228403	2347577
1958	645108	245471	403637	1556089	648114	290664	2494867
1959	618138	256995	361143	1631534	660441	305442	2597417
1960	635057	280267	354790	1783098	679413	286305	2748816
1961	663579	260386	403593	1856523	686826	321737	2865086
1962	763375	302652	460723	2007052	699973	321528	3028553
1963	756308	336998	419310	2277500	746617	345583	3369700
1964	901640	335675	565965	2614611	819786	370821	3805218
1965	959731	356226	603505	3078344	913684	351558	4343586
1966	1022760	414534	608226	3500966	1020618	390983	4912567
1967	1055142	415929	639213	365489	1101101	407128	5377718
1968	576175	440178	536001	3961619	1161995	383525	5507143
1969	791522	450031	341491	3486225	1192131	480784	5159140
1970	815856	434068	381788	3895746	1052267	543979	5491992
1971	993370	475383	517987	3868085	1026494	570900	5465483
1972	1291636	512972	778664	3868089	1068072	685927	5622088
1973	1572186	638083	934103	4483115	1135945	883432	6502496
1974	2162594	785886	1377108	5603894	1359883	895699	7859476
1975	2606358	889316	1717042	7285062	1681256	664950	9631268
1976	2445454	1010314	1435140	8742074	1977964	772958	11492996

Source: Statistics Canada, Quarterly Bulletin of Agricultural Statistics,
Catalogue # 21-003, Ottawa (April-June various years) (exclude Newfoundland)

APPENDIX A-9:
GROSS FARM INCOME, OPERATING EXPENSES AND ASSET VALUES
CURRENT DOLLAR ESTIMATES (\$000'S) 1949-1976 ALBERTA

YEAR	GROSS FARM INCOME	OPERATING EXPENSES	NET FARM INCOME	FARM LANDS & BUILDINGS	IMPLEMENTS & MACHINERY	LIVESTOCK & POULTRY	TOTAL ASSETS
1949	486997	192808	254189	936804	278704	236341	1453849
1950	398402	213073	185329	976709	335705	263799	1576213
1951	458716	238370	260346	1015289	390003	384461	1789753
1952	548081	249488	298593	1015289	418868	351602	1785759
1953	524625	255504	269121	1315622	459663	307001	2082286
1954	421150	247186	173964	1215511	482197	286962	1584670
1955	404137	258798	145339	1265917	466358	303138	2035413
1956	470071	271116	198955	1316323	458370	292475	2067168
1957	477553	275981	201572	1316323	479512	336500	2132335
1958	547277	294067	253210	1466140	497812	410620	2374572
1959	532150	312534	219616	1515845	519245	438137	2473227
1960	545361	325072	220289	1665662	543556	410687	2619905
1961	585791	340313	245478	1715367	550876	452920	2719163
1962	624645	369782	254863	1816271	573655	457967	2843697
1963	584297	392891	191406	1994843	604641	495326	3094810
1964	659693	421927	237766	2238665	654530	528000	3421195
1965	723310	450153	273157	2587147	713757	504916	3805820
1966	838722	385185	453537	2865472	785032	567192	4217696
1967	871784	414851	456933	3280351	823657	602925	4706933
1968	882367	441114	441253	3636080	863031	585194	5084305
1969	811659	442792	368867	3563358	873494	730852	5167704
1970	812321	456261	356060	3532525	874233	793018	5199776
1971	869105	481664	387441	3530252	867446	803936	5201634
1972	1009573	523654	485919	3569085	898456	1008549	5476050
1973	1313486	622970	690516	4025928	956499	1362046	6344473
1974	1842324	844602	957722	5165266	1152920	1335129	7653315
1975	2019142	987018	1032124	6306750	1415017	992509	8714316
1976	2003590	1093881	909709	6950083	1635562	1074037	9659682

Source: Statistics Canada, Quarterly Bulletin of Agricultural Statistics, Catalogue # 21-003, Ottawa (April-June various years) (exclude Newfoundland)

APPENDIX A-10:

GROSS FARM INCOME, OPERATING EXPENSES AND ASSET VALUES
CURRENT DOLLAR ESTIMATES (\$000'S) 1949-1976 E.C.

YEAR	GROSS FARM INCOME	OPERATING EXPENSES	NET FARM INCOME	FARM LANDS & BUILDINGS	IMPLEMENTS & MACHINERY	LIVESTOCK & POULTRY	TOTAL ASSETS
1949	103106	45935	57171	240774	46262	46873	333909
1950	103294	47242	56052	256430	53646	52721	362797
1951	122209	52092	70117	278068	58760	72216	409044
1952	123468	53407	70061	283442	62292	63420	409154
1953	126882	54638	72244	314827	66982	59152	440961
1954	125942	57151	68791	330734	69176	55879	455789
1955	123081	58493	64588	356745	69577	57257	483579
1956	132797	63623	69174	367278	72142	55065	494485
1957	134499	63242	71257	398663	77356	55789	531808
1958	141522	67742	73780	424673	80363	70622	575658
1959	145755	73503	72252	471965	83066	78390	633421
1960	149090	76644	72446	493031	86019	74927	653977
1961	154223	79079	75144	493031	86488	81045	660564
1962	169924	86514	83410	503987	89795	85895	679677
1963	171310	89137	82173	516516	95966	89902	702384
1964	175587	93192	82395	540001	102174	93659	735834
1965	184924	98838	86086	610455	112287	93605	816347
1966	217203	114337	102866	727878	123544	102710	954132
1967	226851	118988	107869	763289	129992	109139	1002420
1968	238119	120640	117479	861651	138204	107969	1107825
1969	233483	130013	103470	904734	148442	125440	1178616
1970	260679	155090	105589	1181961	151836	136081	1469878
1971	276745	165318	111431	1293261	163173	137887	1594321
1972	303600	180209	123391	1355338	169649	163755	1688742
1973	402453	226670	175823	1577613	179465	216998	1974076
1974	487023	285887	201136	2208658	205456	234429	2648543
1975	534147	314676	219471	2659224	252444	188475	3100143
1976	588898	343324	245574	2959716	290798	201499	3452013

Source:

Statistics Canada, Quarterly Bulletin of Agricultural Statistics,
Catalogue # 21-003, Ottawa (April-June various years) (exclude Newfoundland)

APPENDIX E-1:

ANNUITIZED GROSS ASSET VALUES¹, CURRENT DOLLAR ESTIMATES (\$'000) AT 0 % RATE OF INTEREST²

YEAR	CANADA	PEI	N S	N E	QUE	ONT	MAN	SASK	ALTA	B C
1945	247604	2365	4351	4458	36401	63602	24216	53216	47977	11019
1950	269653	2503	4681	4914	39993	68264	26806	58506	52015	11972
1951	311879	2878	5038	5208	46129	84046	30270	65751	59062	13498
1952	314652	2826	5123	5176	46808	82688	30730	68709	58930	13502
1953	333634	2805	5024	5139	46133	86130	33413	71722	68715	14552
1954	328669	2776	4565	5058	46383	87566	31541	65846	65494	15041
1955	340343	2772	4956	5049	46225	91858	31890	74467	67169	15958
1956	347176	2811	4879	5002	47599	94038	32540	76373	68217	16318
1957	357798	2868	4885	4988	48159	99196	32315	77470	70367	17550
1958	387500	3028	4870	5034	50932	109424	34522	82331	78361	18957
1959	406173	3161	4915	4979	52375	117969	34540	85715	81616	20903
1960	418435	3169	4883	4900	53167	116962	36605	90711	86457	21581
1961	434253	3178	4823	4799	53652	123595	38127	94548	89732	21799
1962	451573	3297	4806	4667	54587	129058	38942	99942	93842	22429
1963	478781	3461	4794	4789	56105	130914	42210	111200	102129	23179
1964	515554	3601	4922	4821	57067	139189	47200	125572	112895	24283
1965	568189	3782	5066	4865	59006	146557	52643	143338	125592	26939
1966	625068	4247	5439	4982	62254	161301	58061	162115	139184	31486
1967	691436	4593	5738	5228	65883	182056	63805	177465	155329	33080
1968	740621	4844	6073	5689	70469	204238	67388	181736	167782	36558
1969	769523	5194	6551	6053	75592	233343	66389	170252	170534	38894
1970	785433	5380	6746	5846	74827	222419	68881	181236	171593	48506
1971	788251	5328	6774	5675	71540	226709	67597	180361	171654	52613
1972	830665	5824	7099	6097	79095	241162	69624	185529	180711	55728
1973	974231	6758	8140	6930	91722	291158	80388	214582	209368	65145
1974	1190747	8341	10014	8383	105807	361129	97682	259363	252559	87402
1975	1402023	9182	10784	9930	117566	438884	107968	317832	287572	102305
1976	1610184	9690	11443	10440	135206	507141	124310	379269	318770	113916

¹ Calculated from current estimates of farm asset values, over a 30-year annuity period.

² At exactly zero, the annuity formula is undefined. The figures given represent an annuity factor of 1/30 as the interest rate approaches zero.

APPENDIX E-2:
ANNUITIZED GROSS ASSET VALUES¹, CURRENT DOLLAR ESTIMATES (\$'000)
AT 5 % RATE OF INTEREST

YEAR	CANADA	PEI	N S	N B	QUE	ONT	MAN	SASK	ALTA	B C
1949	487705	4658	8571	8780	71699	125277	47697	104819	94500	21704
1950	531134	4931	9219	9678	78773	134459	52799	115239	102454	23582
1951	614308	5668	9523	10258	90861	165545	59624	129509	116334	26588
1952	619848	5567	10091	10195	92197	163264	60530	135335	116074	26595
1953	657158	5524	9896	10123	90868	169651	65814	141270	135349	28662
1954	647375	5467	9779	9963	91360	172478	62127	137576	129004	29626
1955	670372	5460	9761	9944	91049	180533	62814	146677	132302	31433
1956	685013	5537	9610	9853	93755	185226	64094	150431	134366	32142
1957	704754	5649	9622	9826	94858	195386	63651	152593	138602	34568
1958	763258	5965	9593	9916	100321	215532	67999	162166	154347	37418
1959	800039	6227	9681	9807	103163	232363	68034	168832	160760	41172
1960	824197	6242	9618	9652	104723	230379	72108	178673	170294	42509
1961	855346	6260	9500	9452	105678	243445	75098	186231	176746	42937
1962	885461	6495	9467	9193	107521	254206	76704	196856	184840	44179
1963	943054	6818	9442	9433	110510	257861	83142	219031	201163	45655
1964	1023364	7092	9696	9495	112404	274160	92970	247339	222378	47825
1965	1119160	7449	9978	9583	116223	289461	103692	282333	247378	53063
1966	1235074	8365	10712	9813	122621	317715	114362	319317	274150	62019
1967	1361920	9048	11302	10298	129769	358594	125677	349552	305951	65157
1968	1458759	9541	11562	11205	138802	402288	132734	357964	330480	72009
1969	1515727	10231	12503	11923	148893	459616	130767	335344	335901	76610
1970	1547065	10597	13287	11514	147386	438099	135676	356979	337985	95542
1971	1552615	10494	13342	11178	140913	446548	133146	355256	338106	103631
1972	1636560	11471	13583	12009	155793	475016	137138	365436	355946	109768
1973	1518941	13312	16033	13650	180665	573572	158341	422662	412391	128315
1974	2345410	16429	19725	16512	208408	711314	192404	510866	497465	172155
1975	2761560	18086	21242	19559	231569	864468	212664	626032	566431	201509
1976	3171575	15086	22538	20563	266315	998915	244853	747045	627879	224381

¹ Calculated from current estimates of farm asset values, over a 30-year annuity period.

APPENDIX B-3:

ANNUITIZED GROSS ASSET VALUES¹, CURRENT DOLLAR ESTIMATES (\$'000)
AT 10 % RATE OF INTEREST

YEAR	CANADA	PEI	N S	N E	QUE	CNT	MAN	SASK	ALTA	B C
1949	795335	7596	13577	14318	116924	204298	77783	170935	154108	35394
1950	866157	8041	15034	15783	128461	219271	86103	187928	167079	38456
1951	1001794	9243	16182	16728	148173	265965	97232	211199	189714	43359
1952	1010830	9079	16455	16626	150353	266245	98710	220701	189290	43370
1953	1071672	9008	16138	16508	148185	276661	107327	230380	220722	46742
1954	1055125	8915	15947	16247	148988	281272	101314	224354	210375	48314
1955	1093223	8904	15919	16217	148480	295059	102435	239197	215754	51259
1956	1117098	9029	15671	16068	152893	302062	104522	245318	219120	52415
1957	1149291	9212	15691	16023	154691	318630	103801	246843	226028	56372
1958	1244697	9728	15644	16170	163601	351484	110890	264456	251705	61020
1959	1304678	10154	15788	15993	168235	378930	110948	275326	262162	67143
1960	1344076	10179	15684	15741	170779	375695	117592	291374	277710	69322
1961	1394872	10209	15493	15414	172336	397003	122468	303659	288231	70020
1962	1450506	10592	15439	14992	175341	414551	125087	321027	301432	72046
1963	1537904	11118	15399	15383	180216	420512	135585	357188	328050	74453
1964	1668870	11566	15811	15485	183305	447092	151613	403353	362647	77998
1965	1825092	12147	16272	15628	189533	472044	169097	460420	403417	86533
1966	2020643	13641	17469	16003	199966	518119	186498	520732	447076	101138
1967	2220978	14755	18431	16794	211623	554784	204951	570038	498935	106257
1968	2378964	15559	19507	18273	226354	656039	216459	583757	538936	117429
1969	2471801	16685	21041	15444	242810	749527	213250	546865	547777	124933
1970	2522506	17281	21668	18777	240353	714438	221256	582151	551176	155807
1971	2531956	17114	21758	18225	229796	728216	217130	579341	551373	168998
1972	2666852	18706	22803	15584	254062	774642	223640	595941	580466	179007
1973	3129349	21708	26146	22260	294622	935364	258217	685265	672514	209252
1974	3824823	26792	32167	26928	339866	1159989	313767	833104	811251	280746
1975	4503467	29494	34640	31896	377636	1409748	346806	1020914	923717	328615
1976	5172108	31125	36755	33534	434299	1629000	359299	1218258	1023926	365913

¹ Calculated from current estimates of farm asset values, over a 30-year annuity period.

APPENDIX C-1: ECONOMIC WELL-BEING¹, CURRENT DOLLAR ESTIMATES (\$'000)
AT 0 % RATE OF INTEREST

YEAR	CANADA	PEI	N S	N E	QUE	CNT	MAN	SASK	ALTA	B C
1945	1919937	15467	26534	35005	250558	455883	203640	483602	342166	68190
1950	1606788	16210	29840	36319	261530	437610	156650	317673	237344	68024
1951	2162572	20305	34768	37290	310529	549565	231727	523377	319408	83615
1952	2178322	25168	34597	42348	307827	492969	201685	577111	357523	83563
1953	2112461	15482	34070	25220	275169	470168	180854	616764	337836	86796
1954	1653235	16253	34668	31517	264802	435338	150674	372796	239458	83832
1955	1620680	16249	31514	27242	263191	456579	137990	331453	212508	80546
1956	1782051	17249	32294	31615	248542	405255	164477	467026	267172	85452
1957	1798852	15963	32643	25572	264540	460726	153015	415877	271939	88807
1958	2043156	18783	30560	29169	278688	521598	184345	485968	331571	52777
1959	1927910	18464	28584	25907	260986	502420	176360	446858	301232	93155
1960	1515091	17986	27569	27588	247853	497107	173886	445501	306746	94027
1961	2020827	12871	29580	20605	249924	509308	190605	498141	335210	96943
1962	2160554	14056	28779	22671	259282	547165	190158	560665	348705	105839
1963	2113466	14288	27525	20847	254329	581628	196904	530510	293535	105352
1964	2380475	19805	25796	26002	252293	579932	223127	691537	350665	106678
1965	2653287	27263	29204	37222	286882	641155	263220	746843	398749	113025
1966	2915010	20652	28393	27404	333101	725620	282427	770341	592721	134352
1967	2919174	16856	28338	22310	311388	708886	264272	816678	612262	140945
1968	2903976	16759	29433	22559	332248	777002	249322	717737	609035	154037
1969	2735262	19627	36694	24284	359360	862098	242970	511743	539401	142364
1970	2746843	26257	33341	33285	351240	818997	242323	563024	527653	154095
1971	2911277	18836	29953	26128	356424	804631	253818	698348	559095	164044
1972	3639142	23609	35248	36648	425595	958173	349816	564193	666630	179119
1973	4504736	47224	47307	60538	505741	1150960	439423	1146685	899884	240968
1974	6106853	50844	42316	58418	568406	1535044	578508	1636471	1250281	288538
1975	6792357	44775	48297	50609	698069	1645525	628736	2034874	1319696	321776
1976	6578746	63258	55130	62888	667254	1757906	569933	1814409	1228479	359490

¹ Combines current net farm income and annuity values of current gross farm asset values.

APPENDIX C-2: ECONOMIC WELL-BEING¹, CURRENT DOLLAR ESTIMATES (\$'000)
AT 5 % RATE OF INTEREST

YEAR	CANADA	PEI	N S	N B	QUE	CNT	MAN	SASK	ALTA	B C
1949	2160038	17760	30754	35327	285856	517558	227121	535205	388689	78875
1950	1868265	18638	34378	41083	300310	503805	182643	374406	287783	79634
1951	2465001	23095	39653	42340	355261	631464	261081	587135	376680	96705
1952	2483478	27909	39565	47367	353216	573345	231485	643737	414667	96656
1953	2435985	18201	38542	34204	323904	553689	213255	686312	404470	100906
1954	2011545	18944	39482	36422	309779	520250	181260	440526	302566	98417
1955	1950709	18937	36719	32137	308015	545654	168914	403663	277641	96021
1956	2115288	19975	37025	36466	294698	496443	196031	541084	333321	101316
1957	2145808	18744	37380	34410	311239	556916	184351	451000	340174	105825
1958	2418914	21720	35683	34051	328077	627706	217822	565803	407557	111198
1959	2321776	21530	33350	30735	311774	616814	209854	525975	380376	113424
1960	2320845	21059	32704	32340	299409	610524	209385	533463	390583	114955
1961	2441920	15953	34057	25258	301950	629158	227576	585824	422224	118081
1962	2558482	17254	33440	27197	312216	672313	227920	657579	439703	127589
1963	2577739	17645	32573	25491	308734	708575	237836	638341	392565	127828
1964	2884285	23296	30570	30676	307630	714903	268897	813304	460144	130224
1965	3204258	30930	34116	41940	344095	783659	314265	885838	520535	139149
1966	3525016	24770	33666	32235	393468	882034	338728	927543	727687	164885
1967	3589658	21311	33502	27380	375274	885424	326144	988765	762884	173026
1968	3622154	21456	35322	28075	400581	975052	314668	893965	771733	189488
1969	3481466	24664	43046	30154	432661	1088371	307348	676835	704768	180080
1970	3510475	31474	39882	38953	423799	1034677	309118	738767	694045	201131
1971	3675641	24002	36521	31631	425797	1024470	319367	873243	725547	215062
1972	4444833	29256	42132	42560	502293	1192027	417330	1144100	841865	233159
1973	5449446	53778	55200	67258	598684	1433334	517376	1356765	1102907	304138
1974	7263556	58932	52027	66547	671007	1885229	673230	1887974	1495187	373291
1975	8151894	53679	58755	60238	812072	2071109	733432	2343074	1598555	420980
1976	8140137	72654	66225	73011	798363	2249680	690476	2182185	1537588	469955

¹ Combines current net farm income and annuity values of current gross farm asset values.

APPENDIX C-3: ECONOMIC-WELL BEING¹, CURRENT DOLLAR ESTIMATES (\$'000)
AT 10% RATE OF INTEREST

YEAR	CANADA	PEI	N S	N B	QUE	CNT	MAN	SASK	ALTA	B C
1949	2467668	20698	36160	44665	331081	556579	257207	601321	448297	92565
1950	2203292	21748	40193	47188	349998	588617	215947	447055	352406	94508
1951	2852487	26670	45912	48810	412573	735884	298689	668825	450060	113476
1952	2874460	31421	46325	53798	411372	676326	269665	729103	487883	113431
1953	2850455	21685	45184	40589	381221	660659	254768	775422	489843	118986
1954	2420291	22392	45650	42706	367407	629044	220447	527304	384339	117105
1955	2373560	22381	42877	38410	365446	659780	208535	496183	361093	115847
1956	2551373	23467	43086	42681	353836	613279	236459	635971	418075	121589
1957	2590345	22307	43449	40607	371072	680160	224501	587250	427600	127629
1958	2900353	25483	41734	40305	391357	763658	260713	668093	504915	134800
1959	2826415	25457	39457	36921	376846	763381	252768	636469	481778	139395
1960	2840728	24996	38770	38429	365465	755840	254869	646164	497999	141768
1961	2981446	19902	40050	31220	368608	822716	274946	707292	533709	145164
1962	3155527	21351	39412	32996	380036	783258	276303	781750	556295	155456
1963	3172585	21945	38530	31441	378440	871226	250279	776498	519456	156626
1964	3525791	27770	36685	36666	378531	887835	327540	969318	600413	160393
1965	3910190	35628	40410	47985	417409	966242	379674	1063925	676574	172619
1966	4306585	30046	40423	38425	470813	1082438	410864	1128958	900613	204004
1967	4448716	27018	41031	33876	457128	1111614	405418	1205251	955868	214126
1968	4542315	27474	42867	35143	488133	1228803	398393	1119758	980189	234908
1969	4437540	31118	51184	37675	526578	1378282	389831	888360	916644	228403
1970	4466316	38158	48263	46216	516766	1311016	394696	963939	907236	261396
1971	4654582	30622	44937	38682	514680	1306138	403351	1097328	938814	280429
1972	5477125	36491	50552	50135	600562	1491653	503832	1374605	1066385	302398
1973	6659854	62174	65313	75868	712641	1795126	617252	1623368	1363030	385075
1974	6742965	69295	64465	76963	802465	2333904	794593	2210212	1808573	481882
1975	9853801	65087	72153	72575	958139	2616389	867574	2737956	1955841	548086
1976	10140670	84693	80442	85982	966347	2879765	844922	2653398	1933635	611487

¹ Combines current net farm income and annuity values of current gross farm asset values.

APPENDIX D-1:

NET FARM INCOME, CONSTANT DOLLAR ESTIMATES¹ (\$'000)

YEAR	CANADA	PEI	N S	N E	QUE	ONT	MAN	SASK	ALTA	B C
1945	2876413	22535	38155	52541	368350	674723	308609	740264	506005	98334
1950	2246387	23028	42267	52760	372182	620501	218136	435401	311353	94167
1951	2813053	26489	45190	48765	401888	708197	306215	695592	395726	106578
1952	2758172	33066	44214	55015	386308	606920	253013	752435	441918	103690
1953	2656382	18931	43375	35961	348000	573497	220179	813929	401887	107884
1954	2015558	19946	43560	35155	323260	514703	176317	448366	257467	101811
1955	1854899	19946	39898	32846	321110	535787	157028	380339	215102	95590
1956	2084480	20983	39843	38678	292037	452302	191748	567749	289148	100533
1957	2036690	18508	39231	34745	305818	510562	170589	478282	284888	100710
1958	2273768	21637	35830	33145	312785	566052	205757	554328	347742	101325
1959	2069562	20812	32190	28462	283711	522853	192875	451154	298678	98263
1960	2015451	15954	31089	30553	262177	511929	184866	477784	296656	97561
1961	2115432	12924	32743	21075	261696	514284	203304	538124	327304	100192
1962	2255906	14202	31644	23765	270197	551901	199605	608154	336415	110101
1963	2114193	14003	29516	20768	256370	582923	200071	542308	247552	106277
1964	2357167	20525	26440	26829	247286	558274	222841	716889	301170	104367
1965	2585522	29116	29531	40123	282566	612806	261115	748346	338715	106747
1966	2743130	15686	27545	26906	325016	677183	269239	725871	544244	123439
1967	2584176	14225	26216	19815	284786	611123	232542	741487	530042	125128
1968	2394113	13186	25852	18669	289702	633859	201340	593174	488320	130010
1969	2056788	15395	32153	15446	302686	670672	188353	364257	393458	110368
1970	2015768	21434	27304	28171	283784	612487	178067	351969	365555	108405
1971	2123026	13508	23179	20453	284884	577922	186221	517987	387441	111431
1972	2658458	16836	26648	28922	328020	678770	265248	737135	460003	116810
1973	3106844	35610	34467	47175	367857	756591	315951	822011	607654	154724
1974	3534517	34002	25842	40028	370079	939132	384661	1101686	798178	160909
1975	3881040	25627	27009	25289	417962	868782	374953	1236270	743129	158019
1976	3512375	35712	29125	34965	354699	833843	297082	956760	606473	163716

¹ Calculated from current dollar estimates for economic well-being using the CPI (1971=100) as the deflator.

APPENDIX D-2:

ECONOMIC WELL-BEING, CONSTANT DOLLAR ESTIMATES¹ (\$'000)
AT 0 % RATE OF INTEREST

YEAR	CANADA	PEI	N S	N B	QUE	ONT	MAN	SASK	ALTA	B C
1949	3302292	26603	45639	60208	430960	784119	350260	831795	588526	117281
1950	2659404	27234	50130	61015	439370	735184	263171	533691	398738	114281
1951	3287110	30863	52847	56680	472004	835946	352226	795532	485500	127095
1952	3223917	37249	51795	62675	455584	729594	298495	854124	529134	123673
1953	3154608	23119	50878	43636	416892	702118	270076	921034	504502	129615
1954	2505988	24054	51308	46645	391907	644300	222998	551738	354398	124071
1955	2358606	24048	47232	40318	389522	675737	204225	490550	314511	119208
1956	2589914	25068	46934	45948	361214	588571	239040	678744	388289	124248
1957	2542378	22561	46136	41796	373883	651160	216262	587773	384341	125513
1958	2805934	25796	42519	40059	382732	716328	253168	667396	455357	127413
1959	2621558	25111	38874	35233	354941	683291	239850	607727	409676	126691
1960	2578989	24221	37665	37152	333775	669437	234166	599941	413084	126623
1961	2694435	17162	39174	27473	333232	679078	254140	664188	446947	129257
1962	2851984	18554	37989	29526	342253	722258	251039	740078	460291	139708
1963	2733416	18479	36116	26962	328932	752239	254663	686126	375638	136255
1964	3015268	25086	32675	32935	319571	734581	282628	875947	444176	135125
1965	3250076	33806	36213	46156	355733	795033	326393	926086	494449	140152
1966	3498012	24782	34071	32885	399721	870744	338912	924405	711265	161223
1967	3386242	19553	32872	25880	361210	822307	306556	947346	710224	163501
1968	3213733	18547	32572	24965	367687	859883	275917	794295	673999	170468
1969	2917613	20936	39140	25503	383317	919572	259168	545859	575361	151855
1970	2822145	26957	34230	34172	360606	840837	248785	578038	541723	158204
1971	2911277	18836	29953	26128	356424	804631	253818	698348	559095	164044
1972	3445054	22350	33368	34693	402897	907071	331155	912769	631076	169566
1973	3564168	41557	41630	53273	448572	1012845	386693	1010843	791898	212051
1974	4887114	40675	33853	46735	454725	1228035	462807	1305177	1000225	230830
1975	4850457	32238	34774	36439	502610	1184776	452690	1465105	950181	231679
1976	4385831	42172	36753	41925	444836	1171938	379955	1209606	818986	239660

¹ Calculated from current dollar estimates for economic well-being using the CFI (1971=100) as the deflator.

APPENDIX D-3: ECONOMIC WELL-BEING, CONSTANT DOLLAR ESTIMATES¹ (\$'000)
AT 5 % RATE OF INTEREST

YEAR	CANADA	PEI	N S	N B	QUE	ONT	MAN	SASK	ALTA	B C
1949	3715266	30547	52897	67642	491672	890200	390649	920552	668545	135665
1950	3138652	31312	57755	69020	504521	846392	306840	629002	483475	133785
1951	3746801	35104	60273	64356	539996	959825	396842	892445	572554	146991
1952	3675548	41305	59148	70104	522760	848550	342597	952731	613708	143051
1953	3637737	27180	58154	51078	483657	826842	318461	1024893	604008	150687
1954	2577678	28037	58433	53904	458473	769970	268265	651978	448392	145658
1955	2887050	28026	54345	47563	455862	807567	249992	597421	410908	142111
1956	3080032	29030	53809	52997	428295	721498	284898	786375	484426	147245
1957	3032742	26491	52831	48632	439884	787109	260550	693946	480779	149565
1958	3321975	25829	49005	46763	450559	862050	299142	777037	555712	152712
1959	3157615	29280	45356	41799	424012	838867	285401	720766	517311	154257
1960	3125411	28359	44041	43552	403204	822173	281972	718397	525985	154805
1961	3255893	21271	45410	33677	402600	838877	303435	786431	562965	157441
1962	3429556	22775	44141	35900	412125	887453	300855	868004	580408	168417
1963	3333876	22820	42128	32568	399296	916424	307601	825587	507722	165324
1964	3653427	29509	38722	38857	389664	905544	340603	1030185	582849	164951
1965	3973280	38353	42304	52006	426683	971737	389693	1098439	645464	172544
1966	4230019	29724	40400	38682	472161	1058440	406474	1113051	873225	197861
1967	4164004	24720	39326	31761	435318	1027092	378327	1146967	884945	200711
1968	4008517	23745	35089	31070	443310	1079057	348233	989322	854051	209700
1969	3713563	26309	45915	32165	461505	1160929	327838	721957	751752	192085
1970	3604088	32313	40545	39992	435100	1062268	317361	758468	712553	206495
1971	3675641	24002	36521	31631	425797	1024470	319367	873243	725547	215062
1972	4207775	27696	39885	40290	475504	1128453	395072	1083081	796965	220724
1973	4795512	47324	48576	59187	526842	1261334	455291	1193953	970558	267641
1974	5810845	47146	41622	53238	536806	1508183	538584	1510379	1196150	298633
1975	5869364	38649	42303	43371	584692	1491158	528071	1687014	1150959	303106
1976	5426758	48436	44150	48674	532242	1495787	460317	1454790	1025059	313303

¹ Calculated from current dollar estimates for economic well-being using the CFI (1971=100) as the deflator.

APPENDIX E-4:

ECONOMIC WELL-BEING, CONSTANT DOLLAR ESTIMATES¹ (\$'000)
AT 10 % RATE OF INTEREST

YEAR	CANADA	PEI	N S	N E	QUE	CMT	HAN	SASK	ALTA	B C
1949	4244365	35600	62195	77168	569460	1026117	442397	1034272	771071	159212
1950	3701531	36537	67525	75275	587997	988877	362791	751120	592045	158774
1951	4335781	40538	65787	74191	627111	1118544	454008	1016614	684091	172483
1952	4254200	46502	68567	75621	608830	1000963	399104	1075072	722068	167878
1953	4256746	32384	67476	60613	569290	986645	380454	1157963	731495	177686
1954	3582031	33141	67562	63204	543762	930985	326262	780410	568822	173315
1955	3512868	33123	63457	56846	540860	976475	308631	734350	534417	171454
1956	3707996	34105	62619	62030	514242	891298	343654	924278	607602	176710
1957	3661022	31527	61408	57392	524449	961293	317294	825980	604341	180382
1958	3983152	34996	57315	55352	537463	1048756	358046	917514	693416	185125
1959	3843925	34622	53661	50212	512510	1038199	343764	865598	655218	189577
1960	3825513	33661	52211	51750	492159	1017865	343223	870168	670639	190914
1961	3975261	26536	53400	41627	491477	1043621	366594	943056	711612	193552
1962	4170575	28183	52024	43554	501648	1059109	364720	1031909	734309	205202
1963	4103215	28382	49832	40663	489450	1126786	375428	1004271	671830	202569
1964	4471068	35176	46468	46443	479472	1124551	414884	1227803	760523	203165
1965	4848635	44179	50108	59502	517587	1198141	470796	1319267	838952	214047
1966	5167902	36056	48508	46110	564976	1298926	493037	1354750	1080735	244805
1967	5160510	31340	47596	39296	530268	1289473	470285	1402731	1108807	248386
1968	5026833	30405	47439	38891	540201	1359875	440888	1239199	1084743	259965
1969	4733376	33192	54597	40187	561683	1470168	415820	947584	977753	243630
1970	4605951	39175	49550	47448	530546	1345576	405223	989644	931429	268367
1971	4654582	30622	44537	38682	514680	1306138	403351	1097328	938814	280429
1972	5185011	34545	48234	47461	568532	1412058	476961	1301293	1009511	286270
1973	5660672	54713	57476	66764	627124	1579711	543182	1428563	1199467	338866
1974	6994375	55436	51575	61570	641972	1867123	635675	1768170	1447179	385505
1975	7123537	46863	51550	52254	689860	1883800	624653	1971329	1408206	394622
1976	6760446	56462	53628	57321	644231	1919843	563281	1768932	1289090	407658

¹ Calculated from current dollar estimates for economic well-being using the CFI (1971=100) as the deflator.